THE IRISH NATURALIST

A Monthly Journal

OF

GENERAL IRISH NATURAL HISTORY

ORGAN OF THE

Royal Zoological Society of Ireland; Dublin Microscopical Club;
Belfast Naturalists' Field Club; Dublin Naturalists' Field Club;
Cork Naturalists' Field Club

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AND

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VOL. XXVIII.

DUBLIN: EASON & SON, LIMITED

42 GREAT BRUNSWICK STREET

BELFAST · 17 DONEGALL STREET

LONDON: SIMPKIN, MARSHALL, HAMILTON, KENT & CO., LTD

1919.

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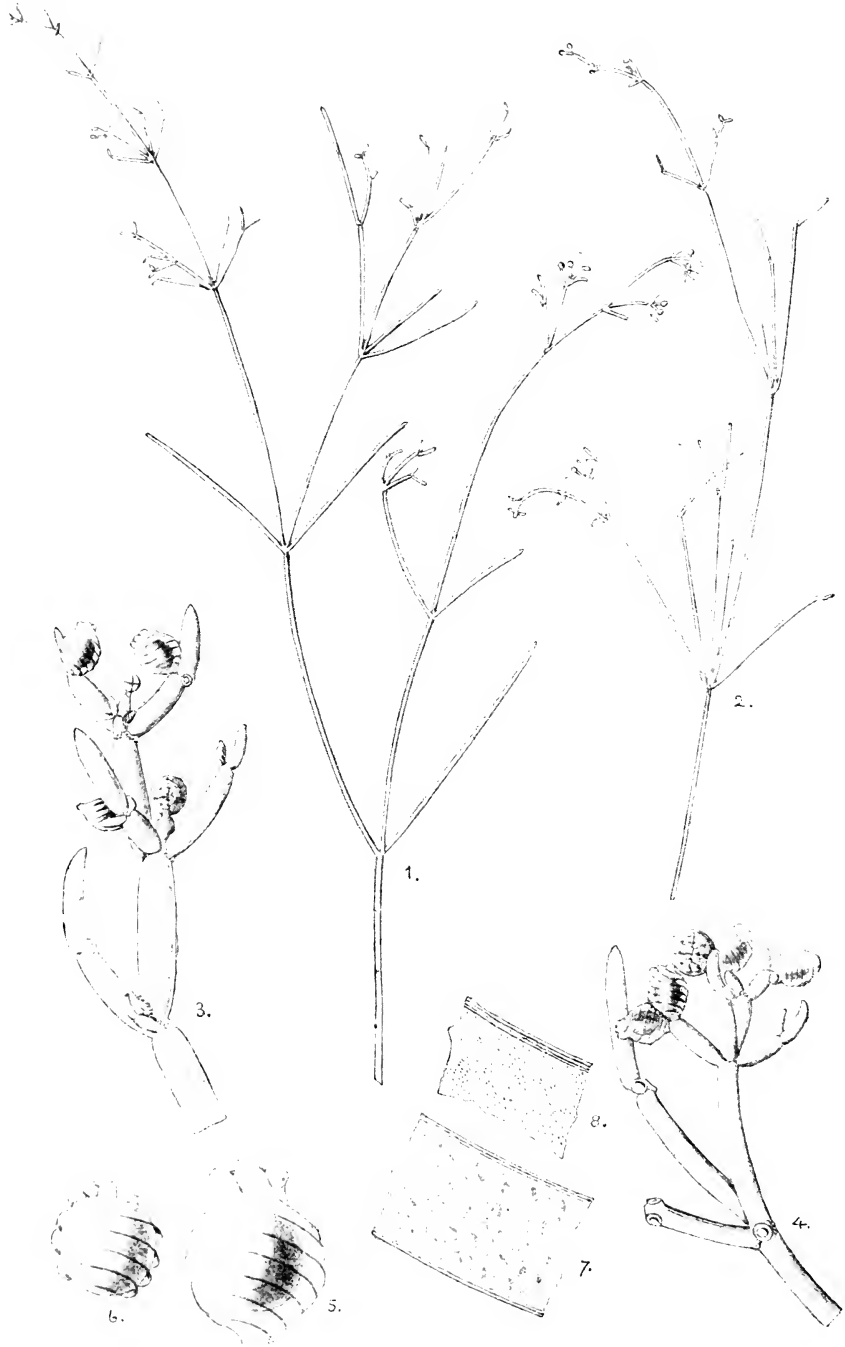

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The Irish Naturalist.

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A NEW NITELLA.

BY REV. CANON G. R. BULLOCK-WEBSTER, M.A., F.L.S.

(PLATE I.).

IN August, 1916, I visited Kindrum in the Fanad Peninsula, County Donegal, with a view to searching for Charophyta in the series of lakes which border on the sea at its northern extremity. One of these lakes, Lough Shannagh, lies at the extreme north-east of the peninsula. It is something under half a mile long and a quarter of a mile broad, and does not exceed 10 or 15 feet in depth. Its northern end, where its shore touches the sandy stretch which divides it from the sea, has a sandy bed; otherwise it has a stony bottom and seems to possess little submerged vegetation. On its western shore the drag brought up two Nitellas, growing closely intermixed in about 4-6 feet of water—the one, *N. translucens*, in sparse quantities, the other growing in great profusion, dull olive-green in colour, very delicate and fragile in habit, and bearing abundant fruit. Its interesting character was not at once observable, but under the microscope it proved to be a plant with very distinctive characteristics. Its exceedingly fragile nature made it very difficult to collect and handle, and almost impossible to lay out on paper with any good results.

I paid another visit to Kindrum in August, 1917, for the purpose of making a further examination of this Nitella and its habitat and, if possible, of collecting better speci-

mens. I found it growing at the same spot and in the same luxuriant abundance, and this time made an attempt to transfer the plant direct from the water to the drying-sheets on the bank of the lake ; but even so it became rapidly flaccid and proved impossible of disentanglement. I preserved a certain amount in formalin, and this has made it possible to examine the plant under more advantageous conditions than if dried and subsequently treated with reagents.

Mr. Groves, who has carefully examined the plant, agrees that its distinctive character justifies its receiving specific rank, and we have drawn up the following description.

One of its main characteristics is the very restricted number of branchlets, and this has suggested to us its name.

Nitella spanioclema Groves & Bullock-Webster, sp. nov.

Monoecia, statura cir. 30-35 cm., caulis tenuis, internodi plerumque vel æquantes longissimis ramulis vel eosdem paulim superantes.

Rami saepe usque ad tres ex eodem nodo orientes, 1-2 in loco ramulorum suppressorum, ut videtur, sæpe abbreviati et inchoati et, quum quidem elongati, non raro verticillos rudimentarios proferentes.

Ramuli pauci, plerumque 2-3 tantum in utroque verticello, normaliter simpliciter-furcati sed aliquando duplicato-furcati.

Laterales radii secundarii singulares, perspicue breviores radiis mediis, sæpe inchoati, brevissimi et inperspicui apud nodos antheridia proferentes.

Radii secundarii unicellulati, apicibus variantibus a forma acuminata ad formam vel rotunde-acutam vel obtuse-mucronatam.

Oogonia et antheridia vel ad eundem nodum vel ad diversos nodos producta. Oogonia vel singularia vel 2-3 aggregata, 800-850 μ longa, 640-680 μ lata.

Cellulae spirales 7 convolutiones exhibentes et versus apices tumifacientes, coronula decidua, c. 60 μ alta, c. 80 μ lata.

Oospora 475-500 μ longa, 425-450 μ lata, 330 μ crassa, 7 strias tenues exhibens alis promulis versus apicem. Membranula rubra aut rubra-fulva, spissa, semi-rigida et translucens, scabra perpusillis tuberculis, et minimis granulis decorata.

Antheridium 575-675 μ diametro.

N. spanioclema is closely allied to *N. flexilis*, being monoecious with branchlets normally once furcate, and the ultimate rays one-celled; its fruit also is very similar. It differs, however, from that species in its fragile and delicate habit, the extraordinary paucity and irregular development of its branchlets and secondary rays, and in its occasional second furcation. When, as often happens, the secondary rays are suppressed or only rudimentary the antheridia have the appearance of being borne on long stalks. In the frequent absence of lateral secondary rays the plant bears a resemblance to *N. monodactyla* Braun, a sub-tropical dioecious plant described and figured in his *Fragmente*. The oogonia are frequently produced at the base of the whorls, and their enveloping cells are divergent and much distended at the apex. The membrane shows the peculiar mottled surface with wart-like protuberances which are characteristic of *N. opaca* and *N. flexilis*, but besides this it possesses a delicate decoration which is absent in those two species. This decoration consists of exceeding minute granules which are at first linear in their arrangement, but at a later stage assume a reticular form.

It will be interesting to ascertain whether the plant occurs in other parts of Ireland. In the Fanad Peninsula it appears to be confined to Lough Shannagh.

EXPLANATION OF PLATE I.

1, 2. Plant natural size.
3, 4. Branches with branchlets showing short solitary and rudimentary secondary rays and conspicuous scars left by fallen antheridia and oogonia, × 10.
5. Oogonium, × 30.
6. Oospore, showing ridges with broad flanges, × 30.
7. Piece of membrane showing wart-like protuberances and minute granular decoration, × c. 200.
8. Piece of membrane showing disposition of granules, × c. 800.

NOTES ON MYRIAPODA XV.—MISCELLANEA.

BY HILDA K. BRADE-BIRKS, M.SC., M.B., CH.B., L.R.C.P., M.R.C.S., AND THE REV. S. GRAHAM BRADE-BIRKS, M.SC.

A.—A new Lithobiid.

Irish material submitted to us for examination includes a new variety of *Monotarsobius duboscqui* (Brölemann),[1] which is characterized as follows :—

Monotarsobius duboscqui fosteri var. nov.

The fifteenth (anal) pair of legs exhibits a diagnostic character, each leg being terminated by a single claw. In all essentials the other characters are those of the species.

Habitat.—Under a large stone about 50 yards from Lough Neagh shore, Raughlan, Co. Armagh.

Dedication.—We have pleasure in naming this variety in honour of our friend Mr. Nevin H. Foster, F.L.S., etc., of Hillsborough, Co. Down, who collected the type specimen, 27. vii. 1918.

Type.—Tube 1412, slide 1414, Brade-Birks collection.

We have suspected the existence of this variety for some time, and no doubt it will be found to be not uncommon in the British Isles.

B.—A Species new to Ireland.

Mr. Foster recently submitted some material to us which included a Julid previously unrecorded for Ireland, viz. :—

Cylindroiulus frisius (Verhoeff).

Syn. : *Iulus frisius* Verhoeff, Berl. Ent. Zeitsch., vol. 36 (1891) 1892, pp. 133 *et seq.*

Externally this species is practically indistinguishable from two other of its congeners known from the British Isles, *C. britannicus* (Verhoeff) and *C. parisiorum* (Brölemann et Verhoeff). The gonopods, however, are fully

[1] Syn. : *Lithobius duboscqui* Brolemann,

diagnostic. So far English material of this species has only been taken on the coast. On the continent it would appear to occur inland. The Irish material submitted to us included both sexes collected by Mr. R. J. Welch at Rosapenna, Donegal W., 30. v. 1913. (Numbered: Tube 1545, slides 1546, 1547, Brade-Birks collection).

C.—Remarks upon Craspedosoma rawlinsi Leach.

This flat-backed millipede has been recorded from several Irish localities, but in view of the confusion which has occurred about its synonymy it is worth while to give the following definite record of an Irish occurrence where a male has been available for dissection.

Mr. Foster has sent us this male taken by Mr. A. W. Stelfox in the hollow dead stem of Seakale in his own garden at Ballymagee, Co. Down, November, 1918. Mr. Stelfox had previously sent us somewhat doubtful specimens from Brussels Sprout plants in the same garden. It is interesting to note that the plants on which these animals were taken were both Cruciferae, as very little is definitely known about the food material of many millipedes.

D.—A Correction.

In our eighth paper in this series (2) we recorded *Brachyiulus* (*Microbrachyiulus*) *littoralis* Verhoeff as new to Ireland. Bagnall (1) has now shown that Verhoeff's species is a synonym for "*Julus*" *pusillus* Leach.

References.

1. Bagnall, R. S.—On the Synonymy of some European Diplopods (Myriapoda), with Special Reference to three Leachian Species. *Ann. & Mag. Nat. Hist.*, Nov., 1918, pp. 407 *et seq.*

2. Brade-Birks, Hilda K., and S. Graham Brade-Birks.—Notes on Myriapoda VIII. Recent Additions to the Irish Fauna. *Irish Naturalist*, vol. xxvii., 1918, pp. 27 *et seq.*

16 Bank Street, Darwen, Lancashire.

ACULEATE HYMENOPTERA FROM THE COUNTIES OF DONEGAL, FERMANAGH AND ARMAGH.

BY REV. W. F. JOHNSON, M.A., F.E.S., M.R.I.A.

As usual the big yellow and black Humble Bee, *Bombus lucorum*, was early on the wing, appearing here on March 23. It was soon followed by *Andrena cineraria* in black and grey, which I saw on April 2nd, busy making its nests in a bank on the roadside. The habits of many, in fact I may say of all these Hymenoptera, *i.e.*, Ants, Bees, and Wasps, are most interesting. The misfortune is that we know so little about them. The species of Pompilus and Salius provision their nests with spiders which they paralyse with their sting so that though unable to move they are yet not dead. They are very active insects, running very quickly but not using their wings much. They are seldom seen except in sunshine; at other times they hide at the roots of grass, etc. The species of Crabro enumerated below are small black insects, very polished and shining. They make their nests in bramble stems, rotten wood, and sometimes by burrowing in sand. They provision their nests in many cases with two-winged flies (Diptera). The Odyneri are Mason-wasps and make their cells in any opening they can find. I have found them trying to establish themselves in the opening for the pulley of a window cord, while the window was open. Like the Common Wasp, they are yellow and black in colour, but the black predominates more than in the Wasp; they are also smaller and more slender in build. Mellinus is a sand wasp more slender than Odynerus and like it yellow and black. It is mostly found about sandhills, where it makes its burrows and provisions them with flies like Crabro. The Halicti are little bees which burrow in the earth and form cells for the reception of their eggs and consequent grubs, for whose support they lay in a store of honey and pollen. They live in colonies and their burrows are often branched. An admirable account of their habits is to be found in J. H. Fabre's book, "Bramble Bees and Others." The species of Nomada are pretty insects, black as to head and thorax, with in some cases red markings and the abdomen yellow with either black or brown bands.

These insects are like the Cuckoo among birds. They make no nest of their own, but place their eggs in those of other species, *e.g.*, Andrena or Euceros. The curious thing is that these intruders are not interfered with by the proprietors of the nests they invade.

The Wasps and Bees of which I have been writing are all solitary, and there are only males and females; but in the Humble Bees (Bombus) we have, as in the Ants, Social Wasps and Hive Bees, workers as well as males and females, and the species live in communities. The females hybernate and in the spring start the nest and new brood, which increases in numbers as the season advances. The Humble Bees differ in the places they make their nests. Some, *e.g.*, the common yellow and black *Bombus lucorum*, make their nests underground like the Common Wasp; others make it on the surface among thick grass or in thick moss, these latter are called Carder Bees, and the light yellow and red *Bombus muscorum* is a typical example. In the following list the species from Tempo were taken in the Manor grounds in the end of May; those from Portnoo, unless otherwise dated, were taken in June.

Leptothorax acervorom F. Workers, Portnoo, September.
Myrmica laevinodis Nyl.—Winged female, Portnoo, September.
Pompilus niger F.—Portnoo, both sexes, in grass on roadside, at foot of a low wall.
P. spissus Schiödte.—Poyntzpass, April, among herbage on roadside.
Salius exaltatus F.—Poyntzpass, May, on canal bank.
Agenia variegata L.—Portnoo, along with *Pompilus niger*.
Pemphredon lugubris Latr.—Poyntzpass, in my garden, in August.
Crabro palmipes L.—Portnoo, sandhills.
C. varius Lep.
C. elongatulus V. de L } Portnoo, among sallows on roadside.
C. chrysostomus Lep.—Poyntzpass, July, in field among herbage.
Odynerus pictus Curt.
O. trimarginatus Zett. } Portnoo, on roadside.
Sphecodles gibbus L.—Tempo.
S. subquadratus Smith.—Portnoo.
Halictus leucozonius Schrank.—Portnoo, September.
H. subfasciatus Nyl.—Portnoo.
Andrena albicans Kirby.—Portnoo.
A. trimmerana Kirby.—Tempo.
A. cineraria L.—Portnoo.
A. gwynana Kirby.—Poyntzpass, April, on roadside.

Coelioxys elongata Lep.
Megachile centuncularis L. } Portnoo.

Nomada alternata Kirby.
N. bifida Thoms.
N. flavoguttata Kirby } Tempo, about burrows of Andrena.

Bombus muscorum L.
B. lapidarius L. } Portnoo, September.

Acton Glebe, Poyntzpass.

IRISH SOCIETIES.

DUBLIN MICROSCOPICAL CLUB.

DECEMBER 11.—The Club met at Leinster House, the President in the chair.

H. A. LAFFERTY exhibited preparations of *Phytophthora cryptogea*, a new fungus recently described, having a wide range of host plants. These preparations showed the peculiar formation of sporangia within sporangia, which often takes place in that species. When affected plants are kept with their roots in water the fungus grows out from the diseased tissues into the liquid, and single sporangia, which quickly liberate their zoospores, are produced on the extremities of the sporangiophores. It frequently happens that a sporangiophore instead of branching laterally to form a second sporangium, continues to grow into the empty first formed one and produces a second within it. This in turn may liberate its zoospores, and a third may be similarly formed within the second. More than three sporangia produced in this way have not been observed.

W. F. GUNN exhibited a slide showing the sporangium walls and capillitium of *Badhamia utricularis*, Berk., a species of Mycetozoa. It is one of the most widely distributed species of the genus and is generally found feeding on fungi such as Stereum and Polyporus. The capillitium consists of a coarse network of threads, which are densely charged with granules of lime which give it a snow-white appearance.

Prof. G. H. CARPENTER showed sections through the feeler of a Common House-fly (*Musca domestica*), in the basal segment of which groups of sensory cells forming nerve-endings somewhat similar in aspect to the taste-buds of vertebrates were demonstrated.

J. N. HALBERT exhibited a Water-Mite, *Arrhenurus insulanus*, Koenike, found in a small pool at Golliersstown, near Lucan, in October, 1899. The specimen is immature, being but weakly chitinized and showing no trace of the circular dorsal line. The colour during life is bright red. The structure of the ventral surface is characteristic and agrees with the description and figures of Dr. Koenike's type specimen, which was found some years ago in the island of Norderny The species is apparently very rare, and the male has not yet been discovered.

NOTES ON THE LAKE-FORMS OF LIMNAEA PEREGER.

BY A. W. STELFOX, M.R.I.A.

STUDENTS of the Irish mollusca are indebted to Mr. H. C. Huggins for his paper in this Journal for August-September last (vol. xxvii., pp. 119-128), in which he has brought together some very striking evidence in favour of the idea that the shells known as *Limnaea involuta*, Harvey, and *L. praetenuis*, Bowell, are merely phases of the ordinary *L. pereger* found in almost all our lakes, both mountain and lowland. In the past many conchologists who have visited Lough Crincaum—the original habitat for *L. involuta*—have expressed doubts as to whether this shell should be classified as specifically distinct from *L. pereger*, yet the latter course has been generally followed. Mr. Huggins has been fortunate in discovering a series of tarns lying close to each other, at about the same altitude, of similar formation, and yet each sheltering a somewhat differently characterized Limnaea, where the whole problem could be studied within a few square miles. One of the things which prompted me to visit the Dingle promontory in 1910 was the possibility of obtaining such evidence as that secured by Mr. Huggins from his study of the Caha Lakes. I was therefore greatly disappointed in not being able to find any Limnaeae in the higher tarns situated around Brandon Mountain.

The only explanation of their absence seemed to be the fact that most of the outlets from these tarns traversed steep, broken ground, and tumbled over numerous waterfalls, thus suggesting that the Limnaeae of the lowlands might have been unable to migrate upwards to the higher tarns. It is interesting, therefore, to note that in several of the more remote and inaccessable of the Caha Lakes Mr. Huggins likewise failed to find any of these shells. If there is any truth in my idea that they find difficulty in ascending these steep outlet streams—in spate one week, after rain has fallen; almost dry at another time, during drought—then we should find the most aberrant forms in the most inaccessable tarns to which the shells have been

able to spread. The reason for this being that the arrival of new blood would be greatly restricted by the difficulties of the passage from the reservoir of the species in the adjoining lowlands. My own work in the West of Ireland has led me to believe that there is something in this suggestion, and Mr. Huggins's evidence rather tends to strengthen this belief.

To return to the larger question of whether *L. involuta*, *L. praetenuis* and the lake forms of *L. pereger* are variations of one polymorphic species, I may say that I arrived some years ago at the same conclusion as Mr. Huggins has, by a study of the different forms of Limnaeae I had collected in the tarns of Kerry, Mayo and Donegal. In working up the Irish list in 1910, nevertheless, I listed *involuta* and *praetenuis* as distinct species out of deference to the anatomical evidence, which seemed to carry great weight in certain sections of the conchological brotherhood, though compared with my own experiences in the field it meant practically nothing to myself. Perhaps it is due to having held these views so long that they appear to be substantiated so satisfactorily by Mr. Huggins's evidence. It is also pleasant to feel that yet another man who has studied the question at first hand has come to similar conclusions; and especially so as since the publication of my views in 1910 and again in 1911, the contrary theory has been upheld by Messrs. Kennard and Woodward in their work on the post-Pliocene mollusca of Ireland.[1] Not only have the authors of this valuable paper considered *L. involuta* and *L. praetenuis* to be distinct from *L. pereger*, but they suggested that they should be placed in a separate sub-genus—Cyclolimnaea of Dall—and they have transferred them to the opposite extremity of the Limnaeidae from the *L. pereger* group; at the same time professing to believe that it has been proved that the affinities of *L. involuta* and *L. praetenuis* lie with *L. glabra* rather than with *L. pereger*.

Old delusions are difficult to eradicate, and erroneous statements once in print get copied long after they have been contradicted. Thus in the recent (1911) monograph of the Limnaeidae of North America Mr. F. C. Baker, in

[1] *Proc. Geol. Assoc.*, vol. xxviii., p. 173, 1917.

quoting Dr. Dall's diagnosis of the sub-genus Cyclolimnaea, of which *L. involuta* is the type species, states: "The mantle covers a portion of the shell as in Amphipeplea." I have been at some pains to trace the origin of this curious myth, and find that the late Dr. Edward Perceval Wright of Trinity College, Dublin, assured Jeffreys that the mantle enveloped the shell.[1] Jeffreys at the same time was careful to point out that neither Thompson nor Goodsir, in their original accounts of the shell and its inhabitant, referred to this peculiarity. Subsequent to the publication of "British Conchology," the statement has been frequently copied. Whether Dr. Wright was the originator of it or not will probably never be known now. Suffice it to say that there is no word of truth in it; nor is there any, I think, in the suggestion that *L. involuta* and *L. praetenuis* are in any way closely related to *L. glabra*.

Conchologists like myself, who in future may desire to unite *involuta* and *praetenuis* with *L. pereger*, will no doubt be in a quandary as to the correct name to apply to these varieties as a whole. To employ the name *involuta*, which possibly has priority, to cover all these fragile lake forms, some of which have elevated spires and few of which possess really intorted spires, seems absurd. Would it not be desirable to restrict the appellation *involuta* to the form found in Lough Crincaum and that of *praetenuis* to the shell found in Lough Nagarriva? Would not likewise the most suitable name for the whole group be "var. *lacustris*," of Leach, who in his Synopsis described as a species—*Gulnaria lacustris*—a form of Limnaea found in the lakes of Westmoreland and Cumberland. His diagnosis is fairly indefinite and could be used to cover all these lacustrine forms, since the character Leach lays most stress on is the "regularity of the grooves" which "at once distinguish this from any other species." Mr. Huggins makes one further important suggestion, namely, that this group of lake Limnaeae may constitute a species distinct from the shells found in rivers, canals and ditches, which we know also at present as *L. pereger*. On this question I have kept an open mind so far, but I am inclined to think that all connecting

[1] See "British Conchology," vol. i., p. 104.

links between these two groups occur. It is to be hoped that Mr. Huggins will be able to follow up this line of research and solve the problem which he has raised ; it is one which affects not only Ireland but probably most of the countries of western Europe, in which there would seem to occur forms of Limnaeae which approach both *L. involuta* and *L. praetenuis*, while Clessin's var. *lacustrina* is possibly their representative in the Alps and other mountain formations in central Europe.

Ballymagee, Bangor, Co. Down.

NOTES,

ZOOLOGY.

Argynnis aglaia in East Waterford.

With regard to Mr. C. B. Moffat's note in the December number of the *Irish Naturalist*, 1918, p. 172, I have taken the Dark Green Fritillary in several inland localities, viz., Ballinamona ; Kilmeadan ; Milepost (Co. Kilkenny). The first mentioned is four miles, while the other two localities are about eight miles from the sea. I believe this butterfly to be widely distributed in Ireland but decidedly local and not wholly confined to the coast. It would be of interest, therefore, that further records especially from inland habitats be forthcoming.

L. H. Bonaparte-Wyse.

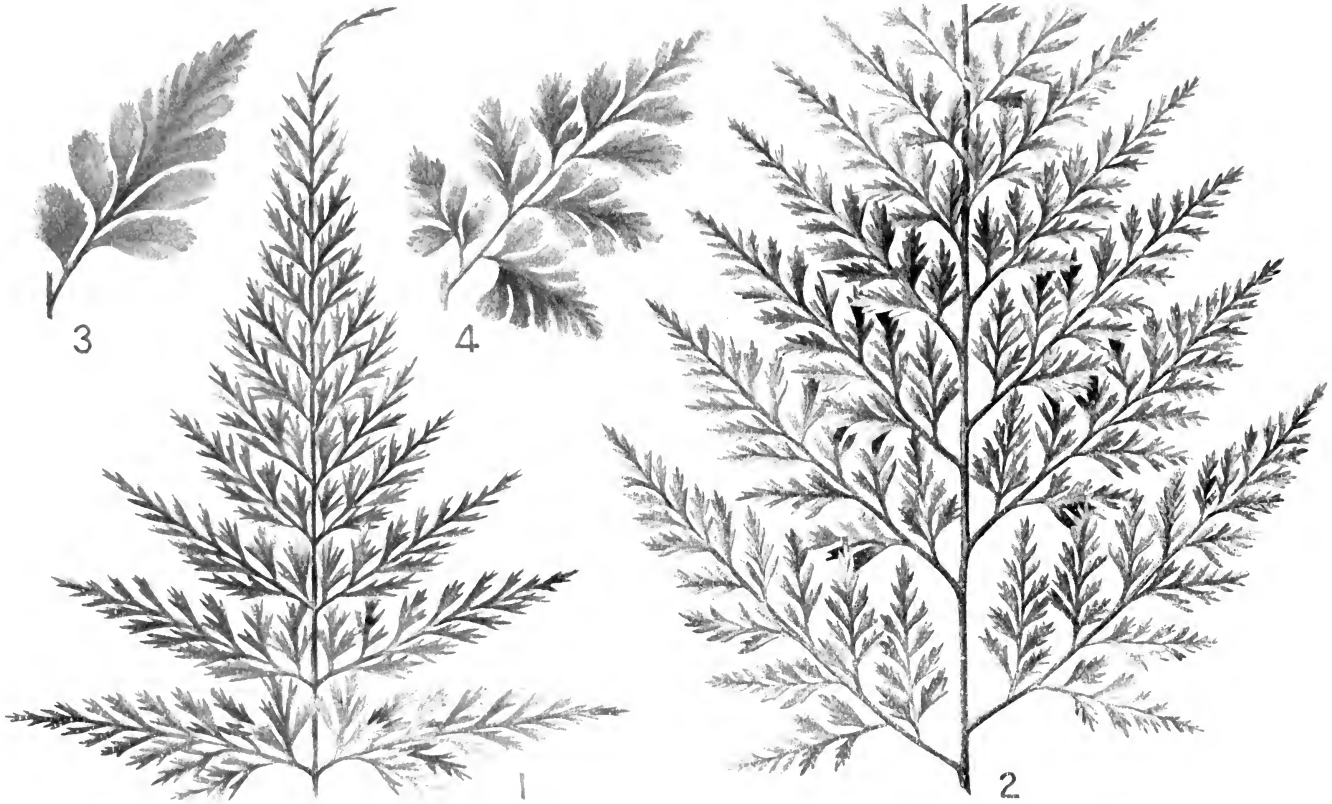
Holland Park Gardens, London, W.

Distribution of Jays.

In the *Irish Naturalist* for December, 1918, p. 174, Mr. Mackay Wilson notes the appearance of the Jay in County Longford. Up to a few weeks ago I had never seen a Jay in Ireland outside of the Queen's Co., where I noticed quite a colony of them (in Abbeyleix Demesne) thirty-five years ago. Last month, however, I saw a pair in the grounds of Castle Howard, Ovoca. On Sunday, 17th December, I saw one at Annamoe, and on the following Sunday I noticed three at Lough Dan, so these handsome birds are evidently spreading over County Wicklow, as well as to other parts of Ireland.

Howard Guinness.

Lake Park, Co. Wicklow.



ASPLENIUM ADIANTUM-NIGRUM VAR. ACUTUM.

To face p. 13.

Eileen Barnes, Del.

ASPLENIUM ADIANTUM-NIGRUM VAR. ACUTUM.

BY R. LLOYD PRAEGER.

(PLATE 2).

In October, 1917, Mr. C. M. Fleury wrote me that he had found *Asplenium Adiantum-nigrum* var. *acutum* near Glendalough, and sent fronds which at first I accepted as that form. On looking up my herbarium, I found that I had collected the same plant in the same station in 1904, but that after examination I had decided that it was not the true *acutum*. This fern possesses a special interest because it has been claimed by some of the leading pteridologists as a distinct species, and also because, unlike most of the innumerable variants found among the ferns, it has a well-marked geographical range, that range being exactly what among plants of the British Isles we call "Lusitanian"—*i.e.*, Ireland (particularly the south-west), Spain and the Mediterranean region, and the Atlantic Islands. These facts, together with the uncertainty which I felt as to the identity of the Wicklow plant, led me to look into the literature of the plant and to examine available specimens, with the results which are summarized below.

The plant is sufficiently well defined in the original description[1]:—"Asplenium acutum. A. frondibus triplicato-pinnatis, pinnis oblongo-lanceolatis longissime acuminatis, pinnulis pinnatifido-incisis, laciniis apice acute subbidentatis, sori demum confluentibus. W. Asplenium acutum. Bory in Litt. . . . Habitat in rupibus Teneriffæ, inque Hispania. . . . Duplo majus præcedente et ex toto triplicato-pinnatum. Apex pinnarum longissime acuminatus."

The "preceding species" to which reference is made is *A. Adiantum-nigrum*—"Frons plerumque bipinnata quandoque inferne tri- et superne bipinnata. A sequente tamen satis diversum: pinnis nunquam caudatis, id est longissime acuminatis, pinnulis non acuminato dentatis, et fronde nunquam ex toto triplicato pinnata" (*l.c.*).

[1] WILLDENOW: Linnaeus' "Species Plantarum" (ed. 4), 5, 347 1810.

So that *acutum* is distinguished from *Adiantum-nigrum* by having fronds twice as large, tripinnate throughout (not bipinnate, or in the lower part tripinnate), with the apex of the frond and of the pinnae extremely drawn out, the pinnules "pinnatifid-incised,"[1] and the lobes "acutely subbidentate" at the apex. The important characters here are the fully tripinnate division and the caudate tips of the frond and pinnae.

As we trace this fern onward through botanical literature, and as illustrations begin to be added to descriptions, a want of uniformity of definition becomes apparent.

Sadler[2] says, "Frons . . . inferius perfecte tripinnata, . . . in medio bipinnata . . . Laciniæ omnes lanceolatæ, acutæ, acutissime et profonde inciso-dentatæ," and emphasizes the acuminate character of the tips of the frond and pinnae. He thus does away with the essentially tripinnate character on which the original description lays special emphasis. In his subsequent work on the Ferns of Hungary,[3] he says, "laciniis lanceolatis, approximatis, acute et profunde inciso-dentatis."

Mackay[4] writes, "I found in 1805, on the limestone rocks at Mucruss, a beautiful and delicate variety with fronds tripinnate throughout, or with pinnules deeply and finely laciniated"—again a description somewhat modified in comparison with Bory's as regards the subdivision of the frond.

Newman[5] (who follows Bory, Sadler, Sprengel[6] and Presl[7] in considering the plant a distinct species) says, "Stipes very much longer than the frond, glabrous, black

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[1] There is a slight contradiction here, since, if the pinnules are only pinnatifid, the frond is only sub-tripinnate, not fully tripinnate. The emphasis laid on the *tripinnate* character justifies the acceptance of this as a criterion as between the type and the variety.

[2] "Adumbratio Epiphyllospermarum Hungariæ," 28, 1820.

[3] "De Filicibus veris Hungariæ," 31, 1830.

[4] "Flora Hibernica," 342, 1836.

[5] "History of British Ferns," ed. 3, 230, 1854.

[6] "Linnaei Systema vegetabilium," 4 (pars 1), 90, 1827.

[7] "Tentamen Pteridographiae," 107, 1836.

at the base; frond elongate-deltoid, very much divided; ultimate divisions linear, very acute . . ." He figures (the same figure appearing in the "Phytologist," **5**, 36, 1854) a form quadripinnate below, tripinnate above, the lobes (below) being linear-lanceolate with linear or lanceolate entire acute divisions. On p. 227 he figures as a form of *A. Adiantum-nigrum* (as opposed to *A. acutum*) a subquadripinnate form, the most developed lobes being broadly lanceolate and cut halfway towards the midrib, the ultimate lobes linear and toothed at the apex where most developed. He may therefore be said to take an extreme view as to the degree of subdivision which constitutes *acutum*.

T. Moore,[1] for whose opinion Newman expresses an undeserved contempt, defines var. *acutum* as follows:—fronds deltoid, tripinnate throughout, and as well as the pinnæ, the lower ones especially, caudate; ultimate pinnules narrow-lanceolate, inciso-pinnatifid, the lobes linear, very acute, entire. He adds that the larger fronds are almost quadripinnate. The plate shows a well developed tripinnate frond with the lobes ovate and cut about half way to the midrib, the teeth being linear, and bidentate at the tips; also a group of fronds of a much less developed form, scarcely even tripinnate, and though markedly caudate at the apices, not worthy of reference to Bory's *acutum*.

Hooker[2] is very moderate in his requirements as to the characters which constitute the variety:—"pinnæ pinnules and segments narrower often linear acute or acuminate." His figure in the latter work represents a form scarcely tripinnate, the pinnules ovate-elongate, the lobes lanceolate toothed at the apex. A more rigorous diagnosis appears in the later editions of Hooker and Arnott's "British Flora":—"lower pinnæ triangular-acuminate bipinnate, ultimate segments linear very acute"; but this is again toned down in Hooker's "Student's Flora" to "lower pinnæ triangular-acuminate, segments narrow very acute"—thus eliminating

[1] "The Ferns of Great Britain and Ireland . . . Nature Printed." Plate xxxvii. and letterpress thereto, 1855.

[2] "Species Filicum," **3**, 188, 1860; and "The British Ferns," plate 33, 1861.

two of the most marked features of the more extreme forms, their tripinnate division and the linear shape of the ultimate divisions.

Britten[1] gives two figures of the plant, one (p. 108), taken from a specimen in the British Museum representing a fine subquadripinnate form, the other (p. 106) no more divided than his figure (p.107) of the type.

E. J. Lowe[2] says, " perhaps even a distinct species . . . Outline pentangular, and in the larger fronds subquadripinnate . . . The apices of the fronds and pinnæ caudate . . . It differs from the normal species in being more subdivided, in its thinner and more papery texture, and in the presence throughout of linear-acute erect segments and teeth." His figure (repeated from his " Ferns, British and Exotic," **5**, 75, 1867) represents a subquadripinnate form with long-ovate lobes.

Boswell and Brown[3] illustrate a fine quadripinnate form with oblanceolate deeply toothed lobes—quite an extreme form, though the ultimate divisions are not so linear as in Newman's figure. In their description they emphasize the satiny lustre of the " mostly tripinnate or subquadripinnate" fronds, the acuminate extremities, the " ultimate pinnules or segments ascending-erect, longly wedge-shaped at the base, very acute, serrate, with mucronate teeth longer than broad."

Babington's diagnosis[4] is " fronds much shorter than the stipe triangular-prolonged, pinnæ and pinnules lanceolate-attenuate, ultimate subdivisions very acute." This would admit as *acutum* a good many plants other than the extreme form.

Christ[5] says of *A. Adiantum-nigrum*—Very variable, from smallish long-lanceolate forms, with broad segments to broad-deltoid large forms with very much divided fronds

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[1] " European Ferns," 106, 1879.

[2] " Our Native Ferns," **2**, 173, 1880.

[3] Sowerby's " English Botany," ed. iii., **12**, 123, pl. 1875, 1883-86.

[4] " Manual of British Botany," ed. ix., 529, 1904.

[5] " Farnkräuter der Erde," 202, 1897.

and very small quite linear acute segments, texture leathery, plant glabrous dark green, shining, often hardy. The latter include *A. acutum* Bory and *N. solidum* Kunze.

From the above quotations it is clear that a considerable diversity of opinion exists as to the amount of deviation from type which constitutes var. *acutum*. It seems obvious from the descriptions and figures that these writers have mostly not adopted Bory's diagnosis, but have made their own descriptions from specimens which they took to be var. *acutum*. This form is not an isolated and constant variety, but every gradation is found from normal *A. Adiantum-nigrum* on to the most extreme forms of *acutum* as figured by Newman and Sowerby.

Considering first the extreme forms, which certainly fall within Bory's definition, examination of a large series of specimens shows that these terminate in two types :—

F. LINEARE (fig. 1).

Most developed lobes lanceolate to nearly linear, divided almost to the midrib into linear segments; not distinctly stalked, the footstalk tending to be winged, as is also the tertiary rachis into which it runs.

This is the most extreme form, var. *acutum par excellence*. If held against the light (the best way of examining a fern), the linear character of the subdivisions and tendency to decurrence are very marked ; in the upper part of the frond especially, and in the middle portion of the lower pinnae, all the parts—the primary and secondary rachis, the lobes and their subdivisions—are about the same width.

So far as I know, this form is in Ireland confined to the south-west. I have seen specimens from—Upper Lake of Killarney (Scully, Praeger) ; Kilcolgan Abbey (Scully) ; Whitegate, E. Cork (R. A. Phillips). Here also belongs the beautiful and extreme form figured by Newman in his "History of British Ferns," and in the "Phytologist," 1854, p. 37, collected on Torc Mountain by Dr. Alchin. It is the plant of Hooker and Arnott's description,[1] but not of Hooker's "Species Filicum" nor "Student's Flora."

[1] "British Flora," 6th ed., 574, 1850.

F. OVATUM (fig. 2).

Most developed lobes ovate to lanceolate, deeply divided into lanceolate segments; distinctly stalked, the footstalks and tertiary rachis not winged.

Viewed against the light, this form, while the amount of its subdivision may nearly equal that of the preceding, is seen to be not nearly so lacy in appearance: the greater breadth of the lobes giving it a heavier appearance, and the narrowness of the footstalks making a sharp contrast between the stem and leaf subdivisions. The tips of the frond and pinnae are not so attenuate as in the preceding plant.

To this form belong specimens which I have seen from Lough Hyne (R. A. Phillips) and Schull (R. D. O'Brien) in Cork; Snowhill, in Kilkenny; and Newtownards in Down (both Praeger). It is the plant of Moore's "Nature-printed Ferns" (plate xxxvii. B., and description), of Lowe's "Ferns British and Exotic" (vol. v., p. 75) and "Our Native Ferns" (vol. ii., fig. 514), of Newman's "British Ferns"(ed. 3, p. 227, middle figure only), and of Britten's "European Ferns," p. 108 (not p. 106).

Following on these extreme forms come others which, being fully tripinnate with caudate tips to the fronds and pinnae, come within Bory's definition of *acutum*, although Irish botanists, rendered fastidious by acquaintance with the extreme forms of south-western Ireland, might be inclined to deny them that rank. Here belongs, for instance, the Glendalough plant which originated this long disquisition. Hooker's figure (Plate 33, i.) in his "British Ferns," approaches var. *acutum* f. *ovatum* but is not extreme enough to be placed under the variety.

Following again on these, forms occur in many parts of Ireland (and elsewhere) which constitute a chain extending from the least divided forms of *acutum* through typical *Adiantum-nigrum* to var. *obtusum* (fig. 3), with very broad blunt and little-divided pinnae and pinnules.

Returning to var. *acutum*, it is to be noted that it is essentially a shade plant, and seems especially partial to dry rocks in sheltered places. This chosen habitat is no doubt in part responsible for the very long stipe (often twice

the lamina), which is usually quoted as a character of the variety; and the development of another characteristic feature, the beautiful satiny lustre, is probably helped by the same cause. Planted in the open, so far as my experience goes, *acutum* produces fronds less divided, and showing by their reflexed pinnules and small size dislike of the excess of light. On the contrary var. *obtusum* is mostly found in exposed situations, and planted in shade becomes larger and more divided, and may revert for all practical purposes to the type; but so far as I have had an opportunity of observing, no change of conditions will induce *acutum* to abandon its tripinnate character, though its fronds may become congested and their caudate character lost, when grown in sunlight.

I should like to add that owing to the exigencies of war-time, I have been unable to check some of my references, and to verify some quotations, where the works from which they are taken were not obtainable in Dublin. The same cause prevents my referring at present to the distribution and characters of var. *acutum* as found outside Ireland. I have to thank Dr. Scully and Mr. R. A. Phillips for kindly supplementing the material available to me by sending the series of *A. Adiantum-nigrum* and its varieties preserved in their herbaria.

DESCRIPTION OF PLATE 2.

1. *A. Adiantum-nigrum* var. *acutum* f. *lineare*. Coll. Isaac Carroll (without locality). National Herbarium.
2. *A. Adiantum-nigrum* var. *acutum* f. *ovatum*. Snowhill, Co. Kilkenny, 1899. R. Ll. Praeger.
3. *A. Adiantum-nigrum* var. *obtusum*. Foynes, 1902. Miss O'Brien. National Herbarium.
4. *A. Adiantum-nigrum* type. Graiguenamanagh, Co. Kilkenny, 1898. R. Ll. Praeger.

All natural size.

National Library, Dublin.

ENTOMOLOGICAL NOTES FROM DONEGAL, FERMANAGH AND ARMAGH.

BY REV. W. F. JOHNSON, M.A., F.E.S., M.R.I.A.

THOUGH I give most of my spare time and attention to the Hymenoptera, I do not altogether neglect other insects, and endeavour to capture or take note of any interesting species I may meet with. The insects noted below were met with here, at Portnoo in Co. Donegal, and at Tempo Manor in Co. Fermanagh. I visited Tempo in the end of May, on the kind invitation of Sir Charles Langham, and had the pleasure of meeting there the Rev. J. M. Brown, who has a parish in that neighbourhood. I spent nearly three weeks in June and the same in September at Portnoo.

LEPIDOPTERA.

On September 30th, 1917, Mrs. Johnson picked up a fine fresh specimen of *Agriopis aprilina*, which was sitting on a stone in the avenue. I was delighted to get this beautiful moth, which I had not met with here before. *Peronca hastiana*, as usual, occurred in a little plantation, which I have made into a hen-run. Every autumn I see one or two specimens in this restricted area, and nowhere else, though there are apparently equally suitable localities close by. On January 7th of this year, on entering the Post Office in Poyntzpass, I noticed a caterpillar on a shelf. I duly captured it and brought it home. It proved to be the larva of *Rumia crataegata*. What it was doing in such a place and how it got there I cannot imagine, for there are none of its food plants within reach. At the end of March Mrs. Johnson made an interesting capture in a very curious way. We were going to Newry by train, and at the station a friend remarked to Mrs. Johnson that there was a moth on her sleeve. Mrs. Johnson very promptly transferred the moth to her hand bag, and when we were in the train told me of her capture. I then got it into a matchbox which I fortunately had in my pocket. On reaching home I found it to

be *Panolis piniperda*, a species which had not occurred here before. It must have dropped off some of the pine trees under which we had passed and sat contentedly on Mrs. Johnson's coat. It was very sluggish, and I had no difficulty in getting it into the matchbox.

At Portnoo, in June, I met with a good many butterflies and moths, though the weather at times was anything but propitious. I was very pleased to find *Melitaea artemis* in numbers on the heathy bogs; I had reared it from larvae from Coolmore, but never had the pleasure of seeing it disporting itself in freedom. *Thecla rubi* was also abundant, starting up from the heather or flying around the Sallow bushes. I observed several *Vanessa io* in fine condition. *Lycaena icarus* and *Caenonympha pamphilus* were plentiful, and I took a couple of particularly fine examples of each. On the hill which rose steeply from the sea I took *Macroglossa bombyliformis* and *Pyrausta ostrinalis*; the former rather worn. I met with it also in a bog further inland. Over this hill there were a couple of small lakes and a grassy valley; here Mrs. Johnson netted a nice fresh specimen of *Euthemona russula* and I met with others subsequently in the same place. Mrs. Johnson also picked up a nice example of *Pygaera pigra*, which she found on heather beside a path through the bog off the Dowros road. *Eulype hastata* was not uncommon, and I took a nice pair in a little ravine on a stormy day. On a heathy bog I took the beautiful *Mixodia schulziana*, also *Eupithecia pumilata* and *E. virgaureata*. I caught a few moths at dusk flying round Veronica bushes, but mostly quite common things; the best were *Hecatera serena*, *Eurois adusta* and *Abrostola tripartita*. I netted a fine *Smerinthus populi* flying to and fro quite slowly, close to the front of the house.

On the leaves of Sallows I noticed what, at first, I took to be the dropping of some small bird, but meeting with a bush on which there were quite a number of these objects, I looked more closely at them and saw that they moved. I took some of them and placed them in a glass jar, where they fed up and pupated, and finally, in the end of July and beginning of August, there emerged little white moths, which I found to be *Coleophora anatipenella*. What I had

mistaken for bird-droppings were the cases in which the larvae lived and in which they also pupated. Stainton[1] describes the case as "brown-black pistol-shaped," which is correct enough, but the resemblance to bird-droppings was very remarkable and at first quite deceived me.

In July Mrs. Johnson brought me a curious-looking larva which she had found on a rose-leaf in our flower garden. This proved to be the larva of *Orgyia antiqua*, and on looking over a Willow bush, also in the flower garden, I found another specimen. These fed up on a Willow and duly pupated, and in the middle of August two female moths emerged. I thought I might attract some males, so left them at the open window, with the result that only one male turned up, though I left the females at the open window for several days and even put them out on the window-sill. Curiously enough, I had never seen either moth or larva here before.

I returned to Portnoo in September, and on the 5th saw a worn example of *Satyrus semele* flying over the heather, which is rather late for this butterfly. The weather was not very good, and I need only mention *Xanthia lutea* (*flavago*), of which I found a fresh specimen sitting on the leaf of a Sallow and *Stilbia anomala*, which I captured on the wing. I also met with the larvae of *Phragmatobia fuliginosa* and *Anarta myrtilli*. When at Tempo Manor in the end of May, I obtained a nice series of *Perizoma flavofasciata* (*decolorata*). They were flying in the evening over *Lychnis dioica*.

Coleoptera.

Sir Charles Langham told me that his son had taken *Carabus nitens* L. on a neighbouring hill. So he and I, accompanied by Rev. J. M. Brown, set off to look for it. We did not succeed in turning it up though we turned many stones and sods in the vain endeavour to discover it. However, Mr. Brown was fortunate enough to take a nice specimen of *Carabus arvensis* crawling over Sphagnum.

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[1] "Manual," ii., p. 387.

At Portnoo, in June, I was brought three fine *Carabus clathratus* L. from a turf bog. *Cicindela campestris* L. was very much in evidence running over stones and among heather and flying in the sunshine. On the sandhills I took the large white form of *Philopedon geminatus* F., also *Amara tibialis* Payk. *Corymbites cupreus* F. var. *aeruginosus* F. occurred among heather, also *Athous hirtus* Herbst., which is an addition to the Irish List. On Sallow bushes *Phyllobius pyri* L. was common. In September the only beetle I took was *Aphodius pusillus* Herbst. on the sandhills. At home a neighbouring farmer brought me a potato leaf on which was a small brownish cocoon. From this there emerged on July 26th *Hypera rumicis* L., a weevil which usually feeds on the Dock. The change of food-plant did not have any effect on the perfect insect, which was quite an ordinary specimen.

ODONATA.

As might be expected in a locality where small lakes abound, Dragon-flies were numerous at Portnoo, and I was able to pick up a good many. In June I took *Sympetrum striolatum* Charp., *Libellula quadrimaculata* L., *Orthetrum coerulescens* Fab., both sexes—this species does not seem to have been found in Ulster before; *Pyrrhosoma nymphula* Sulz; *Ischnura elegans* L., *I. pumilio* Charp. and var. *aurantiaca* Selys. of the female; *Agrion pulchellum* Lind., *Enallagma cyathigerum* Charp., and in September I took both sexes of *Lestes sponsa* Hansem, which were present in numbers.

From this list it seems probable that if I were able to pay more attention to these insects other species might be obtainable in so suitable a locality. If I am able to return next summer and am favoured with fine weather, I may be able to report some fresh species.

Acton Glebe, Poyntzpass.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

November 27.—A public lecture in the theatre of the Royal Dublin Society (by kind permission of the Council) was delivered by Charles Green on "Food from the Sea." The subject of fishes' food and fishes as food for mankind was dealt with from various standpoints and well illustrated with a series of lantern pictures. A large audience was interested in Mr. Green's discourse.

Recent gifts include eleven Belgian "Hares" from Mr. H. F. Stephens, a Toggenburg Goat from Mr. Davidson, and two Ringdoves from Mr Smallman. An Anglo-Nubian male and four female Goats have been purchased in addition to a Sooty Margabey and two Raccoons. A Two-spotted Parodoxure, a pair of Peregrine Falcons, a Blue and Yellow Macaw, and a Blue-fronted Amazon have been received on deposit.

BELFAST NATURALISTS' FIELD CLUB.

November 19.—The Vice-President (S. A. Bennett) in the chair. The President (A. McI. Cleland) read the "Interim Report of the Strangford Lough Survey Sub-Committee," which first dealt with the topography of the lough, its tides, currents, islands, etc. Some interesting facts were brought forward, among them being the maximum sounding of 216 feet at the lough entrance to the Strangford Narrows, diminishing to only 42 feet at the sea exit. After dealing with the general distribution of the islands some points were brought out connected with the nomenclature of the same, from which it would appear that most of the islands are named from their colour or from their fancied resemblance to some object, or from being the resort of some particular animal. The geology of the islands was dealt with very fully in the report, the Sub-Committee drawing particular attention to the question of "erratics" and their bearing upon the general theory of the northern glacial ice-flow, particularly in respect of the presence of Ailsa Craig eurite and Castle Espie limestone among the erratics. The section of zoology was touched on, as requiring more workers in order to do it justice. Coming to botany, there was evidence here that much good work has been done. Lists of the plants occurring in the neighbourhood had been compiled, due account being given of the mosses and seaweeds to be found in the area.

The lecture was illustrated by lantern slides, maps, and a collection of erratics, flowering plants, seaweeds, birds, snails, &c. Particular mention should be made of the block of Castle Espie limestone found by Mr. R. Bell *in situ*. Its surface had been finely polished by ice action, and showed glacial striae running in two directions. The meeting terminated with some remarks from Dr. Charlesworth and Mr. Bennett.

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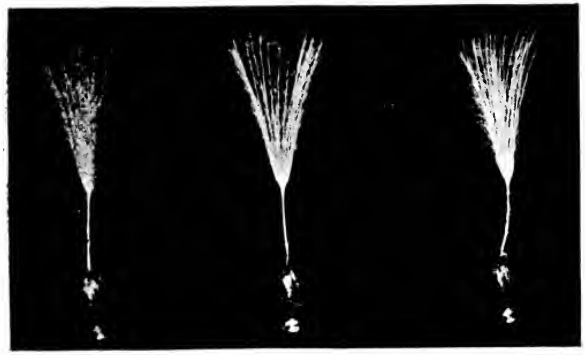

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HETEROCARPY IN PICRIS ECHIODES.

To face page 25.

HETEROCARPY IN PICRIS ECHIOIDES.

BY GEORGE H. PETHYBRIDGE, B.SC., PH.D.

(PLATE 3).

HETEROCARPY is the term employed for describing the condition which arises when one and the same species of plant produces in the same individual two or more distinct and different types of fruit.

The subject is not one which is dealt with, as a rule, in botanical text-books, and the literature on it, although fairly considerable in amount, is somewhat scattered and not always very accessible. A short list of the more important relevant papers is appended to this article; and further bibliographical references will be found in the papers referred to.

The principal families in which heterocarpy is known to occur are the Compositae, the Chenopodiaceae and the Cruciferae; while in some of the Umbelliferae we have examples of heterocarpous mericarps.

Picris (*Helininthia*) *echioides*—the Bristly Ox-tongue—one of the Compositae, is not a common plant in Ireland. In Praeger's Topographical Botany it is recorded from only seven County divisions and is regarded as a possibly introduced species. Its seeds (in reality one-seeded fruits) are sometimes found as impurities in agricultural seeds imported into the country, chiefly in clovers of Italian origin. The plant is mentioned, and what may, perhaps, be termed its normal fruit is illustrated, in Johnson and Hensman's paper[1] on Agricultural Seeds and their Weed Impurities.

This normal fruit is more or less cylindrical or slightly flattened and has transverse wrinkles on its surface which are more prominent towards its upper end. Its somewhat contracted top passes into the stalked, plumose pappus

[1] *Sci. Proc. R. Dublin Soc.* xii. (n. s.) no. 33. July, 1910, p. 455, and Pl. xxiii., Fig. 44.

which, however, is easily broken off leaving the fruit pointed or "beaked." It is in this condition, *i.e.* without the pappus and its stalk, that the fruit is found in samples of agricultural seed. In colour the fruit varies from a light to a dark golden brown. An illustration of this fruit will be found in fig. 1, Plate 3.

The foreign seeds which occur in imported agricultural seed are of much interest. Not only may they constitute one of the sources of origin of our alien flora, but also not infrequently they are of considerable service in helping to ascertain the country of origin of imported seed, a matter in some cases of great importance.

Unfortunately it is not always easy to identify such seeds, because the study of seeds has received but scant attention at the hands of the compilers of the various Floras. So far as I am aware there is no standard work dealing exhaustively with the seeds even of the plants which constitute the Britannic phanerogamic flora. Indeed, it is very doubtful whether there is any museum or other institution in the British Isles which possesses a complete collection of the seeds of our native flowering plants.

Field naturalists and amateur workers at the present day may sometimes imagine that in the matter of the collection and systematic description of plants, there is little or nothing left to be done so far as our own flora is concerned. But in the matter of seeds there is a distinct hiatus which enthusiastic workers might do worse than attempt to fill. Here, surely, is a subject in which the Irish Naturalists' Field Clubs, under the auspices of their Field Club Union, could effectively co-operate; and with united forces the non-existence in our National Museum of a complete collection of the seeds of our native flowering plants could be rectified within a comparatively short time. I venture to commend this matter to the attention of those who have the necessary leisure and opportunity to take it up, and this must be my apology for the short digression from my subject.

Failing identification of an unknown seed with the help of the incomplete reference collections and literature which

may at present be available, there is still one way in which the desired information can sometimes be obtained, and that is by sowing the seed and identifying the plant which develops from it.

Of course if the seed is dead this cannot be done, and even if alive, strict precautions are necessary to ensure that the plant which develops does, in reality, emanate from the seed sown. Ordinary soil contains many viable seeds and mistakes are liable to arise unless this fact is taken into account.

During recent years quite a number of unknown seeds have been identified by this means at the Seed Testing Station of the Department of Agriculture and Technical Instruction, in the Royal College of Science, Dublin. On some future occasion, perhaps, with the approval of the Editors, some account of this work may be presented to the readers of the *Irish Naturalist.* At present, however, attention must be confined to one instance.

In 1913 an unknown seed was found amongst the impurities in a consignment of Lucerne seed. This particular consignment came to England, but whether any of it ever reached Ireland is not known. The same kind of seed, however, has since then been found in stocks of Red Clover seed imported into this country.

The seed was curved in shape, of a creamy white colour and slightly hairy. It resembled, on a very minute scale, a peeled banana. It was sown in a pot of sterilised soil and kept in a greenhouse. In 1914, to our surprise, it produced a plant of the Bristly Ox-tongue, *Picris echioides.* Hence it was clear that this plant must possess two kinds of seeds (one-seeded fruits) which were quite unlike one another externally.

In 1918 specimens of this "peeled banana" type of seed were submitted for identification by the English Seed Testing Station recently established in London by the Food Production Department of the Board of Agriculture and Fisheries, and thus interest in the matter was again aroused. In September of that year I was fortunate enough, during my holidays, to be very favourably placed for the study of the Bristly Ox-tongue, since it grew in considerable

abundance in the cliffs above Sanders' Beach at East Looe, Cornwall, where I was then staying.

The plant probably derives its common name from the hairs with which its parts are somewhat liberally covered. These hairs are stiff, and while some of them end in a simple sharp point, others are branched at their apices, the branches being bent over and forming minute sharp hooks, three being the number usually present at the top of each hair. These hooked hairs easily grip one's clothes or the natural coverings of other passing animals, and possibly play some part, as will be discussed presently, in effecting the plant's dissemination.

The head of flowers is surrounded (as is usual in the Compositae) with an involucre of bracts. The five outer phyllaries of this involucre are large and more or less cordate or sagittate in shape. They are well provided with hooked hairs, particularly on their margins. These cover about ten other bracts, almost linear in shape, and these in turn cover eight larger ones, each with a swollen, keeled base (concave on its inner face) and a tapering apex, the midrib being prolonged beyond the bract as a sort of awn which has a more or less feathery appearance, owing to its covering of longish hairs.

The eight innermost bracts are provided with both plain and hook-topped stiff hairs, and they are generally arranged in two whorls of four each, alternating with one another.

The flowers surrounded by this somewhat complex involucre are all ligulate. The number present in each head varies with the size of the head. In twenty heads selected at random, the number varied from fifty-one to eighty-three, the average being sixty-seven.

At the flowering stage a casual look seemed to show that all the flowers were exactly alike, but careful examination showed that this was not strictly correct. Although no differences whatever could be seen in the corollas, stamens, styles and stigmas of the various flowers there were, in each head, a few individuals situated at the periphery of the disc, in which the transition from pistil to the, as yet, non-elongated pappus-stalk was much less abrupt than in

the majority of the flowers situated on the disc. These peculiar ray-florets which, on the average, were only three or four in number while the disc florets averaged about sixty-three in each head, were situated opposite to the four members of the outer whorl of the eight bracts referred to above and consequently alternate with the inner four.

It is these few ray-florets which produce the seeds (one-seeded fruits) of the "peeled banana" type. After flowering, and as the fruits ripen they become curved and rather closely pressed into the concavity of their sheltering bracts, and to some extent even, become gripped by the edges of the latter. When ripe, therefore, they are not nearly so easily dispersed by the wind as are the majority of the now golden-brown fruits on the disc. The pappus-stalk of the ray-fruits is shorter than that of the disc fruits, and the pappus of the former is, perhaps, not quite so well developed as that of the latter, but it is by no means to be regarded as hypertrophied, or incapable of functioning. One of the ripened ray fruits with its pappus is illustrated on the accompanying plate (fig 2).

A puff of wind acting on a dry ripe fruiting-head quickly removes the disc fruits and leaves behind the few ray-fruits gripped by the bracts. But these ray-fruits are also ultimately dispersed, for plenty of heads were observed in which all of the fruits, both disc and ray, were absent. Since no heads, examined at an earlier stage, were found in which the peculiar ray fruits were entirely absent, it was concluded that both disc and ray fruits are ultimately dispersed by the wind.

The temporary retention of the few ray fruits seems rather a curious phenemenon. It serves, perhaps, to explain how it is that these fruits are harvested with a crop of ripe Clover or Lucerne, and thus find their way into agricultural seed. But the advantage, if any, to the plant under perfectly natural conditions is less obvious. It occurred to me that possibly, during this period of retention, dispersal by passing animals might occur. The heads, at this period, are practically dead and dry, and they break off somewhat easily. Owing to the hooked hairs of the phyllaries, each head could be carried away

without much difficulty bearing the retained fruits with it. If this be what actually occurs then this plant has evidently evolved two strings to its bow in the matter of dispersal, a main one—wind, and an accessory one—animals.

Although outwardly the two kinds of fruit are dissimilar there is not really any very significant difference in their microscopic structure, as will be seen by comparison of figs. 3 and 4 on the accompanying Plate. Each contains a single seed and although the ray fruit is considerably larger than the disc fruit, the seeds themselves are more or less of the same size. But the cavity in the former is larger than that of the latter and the seed does not so completely fill it.

The principal difference between the two kinds of fruit lies in the structure of their walls. In both cases the main inner portion of the fruit wall is made up of a few layers of compact fibrous cells with highly refractive thickened walls. In the brown wrinkled disc fruit this is succeeded by a single layer of small thin-walled cells, and this by the epidermis, a single layer of cells the brown walls of which give the colour to the fruit.

In the " peeled banana " ray fruit, however, the fibrous cells are followed by a broader band of thin walled cells, the width of which varies, being greatest at the sides and back of the fruit. Outside of this comes the epidermis, the cell walls of which are not coloured. The hairs arise from the epidermis and are more plentiful on the concave than the convex side. These points will be clear from an examination of the photographs of transverse sections of the two kinds of fruit reproduced on the accompanying plate.

Becker has shown that in some plants which are heterocarpous, or which bear more than one type of seed, the behaviour of the different kinds of fruits or seeds on germination is dissimilar. To ascertain whether this was the case in *Picris echioides* the few ray fruits and a corresponding number of disc fruits from each of twenty heads were placed under conditions favourable to germination. Fifty-nine fruits of each kind were thus treated. Thirty-one of the disc fruits and twenty-nine of the ray

fruits germinated within seventeen days, the remaining fruits in each case were dead and mouldy. The two kinds of fruits, therefore, germinated equally well. Moreover, there was no difference in the promptness with which the viable fruits of the two kinds started to sprout, so that the "germinating energy" was also the same.

It will naturally be asked whether the two different kinds of fruits produce plants which are morphologically identical. This question cannot be answered with absolute certainty at the moment, but as far as can be seen up to the present seedlings raised from the two kinds of fruit and growing in pots side by side are indistinguishable. Moreover, the plant raised in 1914 from a ray fruit was identified at once as *Picris echioides* and no peculiarity in structure was observed. Further information will be available when the seedlings, at present being grown, flower and fruit which will probably be during the coming summer. There seems no reason to expect any variation for, after all, it is the *fruits* which are different; the seeds and the embryos within them appear to be quite similar.

At the time when the observations recorded here were being made I was not certain whether heterocarpy in *Picris echioides* had been recorded by any previous writer, or not. My first search in the literature failed to find any such record, but a further hunt, aided by my friend, Mr. A. D. Cotton, of Kew, resulted in the discovery of Delpino's account of the matter, published in 1894. This author briefly describes the external appearances of the two kinds of fruit but makes no reference to the relative number of each of them present in each head. With regard to the supposed functions of the two kinds of fruit, I am not, however, in entire agreement with him. He lays stress on the poorer development of the pappus in the ray fruits, and even goes so far as to say that it is a useless organ perpetuated by heredity, although it cannot exercise its function. Hence, he considers that the ray fruits serve merely for dispersal "*in loco*," if such a contradiction of terms may be pardoned. I do not regard the pappus of the ray fruits as a useless organ, at all. On the contrary, I think it is probably of just as much service to the ray

fruit in the matter of wind dispersal as the somewhat better developed pappus of the disc fruit is to itself for the same purpose. The ray fruit is certainly larger than the disc fruit, but since it contains a fairly large air cavity it is probably quite as buoyant, or, perhaps, more so; and its pappus is by no means so ill-developed as to be functionally useless, at any rate in Cornish specimens.

Delpino also compares the appearance of the disc fruits with that of small coleoptera, and suggests that this mimesis may be of great use to the fruits after they have been scattered by the wind. This, however, to my mind is rather an unnecessary incursion into the realms of speculative teleology.

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EXPLANATION OF PLATE 3.

Fig. 1. Three of the golden-brown, wrinkled disc-fruits of *Picris echioides*. × 2·75.

2. Three of the whitish, hairy ray-fruits from the same flower-head. × 2·75.

3. Transverse section of disc-fruit. × 30.

4. Transverse section of ray-fruit. × 30.

Royal College of Science, Dublin.

IRISH ICHNEUMONIDAE AND BRACONIDAE.

BY REV. W. F. JOHNSON, M.A., F.E.S., M.R.I.A.

In the following list will be found species from the counties of Armagh, Donegal, Fermanagh, and Mayo, though I regret to say that there is only one record from the last named county. I took a good many species at home, but most of my captures were made in Donegal, where I was able to give my whole time to the pursuit and capture of these interesting insects.

In April I was fortunate enough to capture *Ichneumon militaris* Grav. again. It is decidedly rare, and I have so far only met with single specimens, and those females. In the same month I found larvae of the sawfly *Pteronus pavidus* Lep. feeding on a willow bush on the roadside. I brought some of these home and was much pleased to rear from them *Mesochorus confusus* Hlgr. and *M. dimidiatus* Hlgr.

In August Mrs. Johnson found a cocoon on a Forget-me-not leaf. From this emerged *Angitia interrupta* Hlgr. I was unable to make out the larva from which it had bred, the crumpled skin merely showing that it was small and hairy.

I spent a few days at the end of May with Sir Charles Langham, Bart., F.E.S., at Tempo Manor, where I made some captures. He has very kindly allowed me to record some interesting species which he had captured or bred.

I visited Portnoo twice, first in June, and then in September, spending almost three weeks there on each occasion. It proved, as I had anticipated, a very prolific locality, and I took many nice specimens there. In June I found the best locality to be a piece of road bordered with sallow bushes on one side and running through heather and bog. I call it "bog road" The sallow bushes were a great resort of Ichneumons as well as other insects. It was very pretty to see the males of *Banchus volutatorius* L. coming sailing along over the tops of the bushes with their long legs outstretched; needless to say, they were easily

netted. But others were not so simply dealt with, for they would crawl about on the leaves and twigs in the heart of the bush, where it was very difficult to follow their course, and quite impossible to get at them with the net, so I had either to wait with whatever patience I could muster for them to come out into the open or else try and catch them with finger and thumb, a process by no means always attended with success, for no matter how careful I might be I was pretty sure to shake the leaf or twig and then the insect was liable to drop suddenly into the impenetrable jungle at the roots of the bush.

In September my best locality was a little patch of meadow on the edge of the cliff. When the sun shone here I was sure of a good bag. The Ichneumons were either flying at the edge of the cliff or crawling about on the herbage and especially on some patches of Common Vetch, which seemed peculiarly attractive to them, though for what reason I could not make out, as I did not see any of them sucking at the flowers, nor did I see a larva of any sort for them to prey on. This place I call "cliff."

I regret to say that the insect I recorded[1] as *Spilocryptus mansuetor* Tschek turns out to be only a female of *Pycnocryptus peregrinator* L.

I have once more to thank Mr. Claude Morley for kind help with some critical species.

ICHNEUMONIDAE.

ICHNEUMONINAE.

Cratichneumon liostylus Thoms.—Portnoo, September,—var. with clypeus and face black.

C. fabricator Fab.—Portnoo, June and September.

var. **impugnator** Wesm.—Tempo, May; Portnoo, September.

Melanichneumon sanguinator Rossi.—Portnoo, September, cliff. I took quite a number of this pretty species.

Barichneumon semirufus Gr.—Portnoo, June, bog road.

B. albicinctus Gr.—Portnoo, June and September, both sexes in number.

B. lepidus Gr.—Poyntzpass, August, on hill.

[1] *Irish Naturalist*, xxvii., p. 106.

Ichneumon deliratorius L.—Tempo, taken by Sir C. Langham.
I. xanthorius Forst.—Portnoo, September, cliff.
I. sarcitorius L.—Portnoo, a male bred by Sir C. Langham from *Dianthecia caesia*.
I. latrator Fab.—Portnoo, September, cliff.
var. **means** Gr.—Portnoo, September, cliff.
I. spurius Wesm.—Portnoo, September, cliff, a female of this rare species.
I. militaris Gr.—Poyntzpass, April at flowers of Hedge Parsley.
I. confusorius Gr.
I. caloscelis Wesm. } Portnoo, September, cliff.
Ctenichneumon castigator F.—Tempo taken by Sir C. Langham; a female var. with legs black except the inside of the front tibiae.
Amblyteles palliatorius Gr.—Mallaranny, taken by Sir C. Langham both red and black forms.
var. **erythropygus** Gr.—Portnoo, cliff on vetch; the yellow and black form.
A. armatorius Forst.—Portnoo, September, bog road.
A. subsericans Gr.—Portnoo, a freshly emerged female sitting on plant of *Erica cinerea*.
Probolus alticola Gr.—Tempo taken by Sir C. Langham, Portnoo, September, cliff.
Platylabus orbitalis Gr.
P. dimidiatus Gr.
Herpestomus brunnicornis Gr. } Portnoo, September, cliff.
Phaeogenes planifrons Wesm.
P. ophthalmicus Wesm.
P. heterogonus Hlgr.—Poyntzpass, August, hill.
P. callopus Wesm.—Poyntzpass, July, in house.
P. rusticatus Wesm.—Portnoo, September, cliff, a small female.

CRYPTINAE.

Cubocephalus oviventris Gr.—Portnoo, June, in window.
Microcryptus basizonius Gr.
Glyphichnemis profligator Fab. } Portnoo, September, cliff.
G. suffolciensis Merl.—Poyntzpass, July, fields.
G. senilis Gmel.—Portnoo, June, mountain road.
Phygadeuon rufulus Gmel.
P. leucostigmus Gr. } Portnoo, September, cliff.
P. exiguus Gr.—Poyntzpass, April, herbage.
P. scaposus Thoms.—Portnoo, September, cliff.
Hemiteles fulvipes Gr.—Poyntzpass, May, emerged May 8th from dark smoky coloured cocoon.
H. tristator Gr.—Portnoo, June, in house.
H. ridibundus Gr.—Portnoo, September, cliff.
Pezomachus carnifex Forst. var. **rufulus** Forst.—Portnoo, September, cliff.

Pycnocryptus peregrinator L.—Poyntzpass, June and July, fields with sexes.

Spilocryptus migrator F.—Tempo bred by Sir C. Langham from *Saturnia pavonia*, Portnoo, June.

S. abbreviator Fab.
var. **Hopei** Gr. } Portnoo, September, cliff.

Idiolispa analis Gr.—Poyntzpass, July, field.

PIMPLINAE.

Pimpla ruficollis Gr.—Poyntzpass, May, field.

P. punctiventris Thoms.—Portnoo, September.

P arctica Zett.—Tempo, May.

P. maculator Fab.—Poyntzpass, April, in Acton Wood. Portnoo, September, cliff, a var. with abdomen entirely black.

Clistopyga incitator Fab.—Portnoo, June, on roadsides.

Glypta ceratites Gr.—Poyntzpass, August, field.

G. genalis Moll.—Portnoo, September, cliff.

G. vulnerator Gr.—Poyntzpass, August, hill.

G. scalaris Gr.—Portnoo, June.

Lissonota errabunda Hlgr.—Poyntzpass, July, field.

Banchus volutatorius L.—Portnoo, June, bog road, both sexes.

Exetastes guttatorius Gr.—Poyntzpass, July, field.

TRYPHONINAE.

Metopius peltator Marsh.—Portnoo, September, cliff, a female with the scutellum entirely black.

Exochus flavomarginatus Hlgr.
E. tibialis Hlgr.
Homocidus tarsatorius Pauz. } Portnoo, September.

H. dimidiatus Schr.
Promethus sulcator Gr. } Portnoo, June, roadside.

Mesoleius semicaligatus Gr. var. **insolens** Gr.—Portnoo, September.

M. aulicus Gr.—Portnoo, June.

Dyspetes praevogator L.—Portnoo, September, cliff, both sexes plentiful.

Mesoleius villosulus Thoms.—Portnoo, June.

M. ruficornis Gr.—Portnoo, September, at flowers on roadside.

Catoglyptus fortipes Gr.—Portnoo, June.

var. **crassipes** Hlgr.—Portnoo, in this variety the hind femora are nearly or entirely black instead of red. It appears to be rare in the British Isles for Morley[1] only gives one record for London district. I took several in June on the bog road and elsewhere.

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[1] "British Ichneumons," vol. iv., p. 235.

Euryproctus notatus Gr.—Portnoo, September, cliff.
Perilissus filicornis Gr.—Portnoo, June.
Polyhlastus variitarsus Gr.—Portnoo, June and September, cliff.
P. pratensis Gr.—Portnoo, September, bog road and cliff.
P. rivalis Hlgr.—Portnoo, June.

OPHIONINAE.

Campoplex terebrator Forst.
C. anceps Hlgr.
C. leptogaster Hlgr.
C. monozonius Forst.
Portnoo, June, among sallows mostly on bog road.

Sagaritis punctata Bridg.—Poyntzpass, July, field.
Cymodusa leucocera Hlgr.—Portnoo, September, cliff.
Casinaria ischnogaster Thoms.—Portnoo, June.
Limnerium albidum Gmel.—Poyntzpass, May; Coolmore, September.
L. rufifemur Thoms.—Poyntzpass, July and August, field.
Meloboris rufiventris Gr.—Portnoo, June.
M. crassicornis Gr.—Portnoo, September, sand hills.
Pectenella latungula Thoms.—Poyntzpass, July, field; Portnoo, September, bog road. It also emerged from *Coleophora anatipennella* of which I had taken larvae at Portnoo in June. The fly appeared in July.
Angitia rufipes Gr.
A. fenestralis Hlgr.
Portnoo, September, cliff.
A. interrupta Hlgr.—Portnoo, September, roadside. Poyntzpass, a female emerged August 16th from pupa on leaf of Myosotis. The fly emerged from an irregular opening at the end of the cocoon.
Anomalon latro Schr.
A. cerinops Gr.
Portnoo, September, among sallows.
Mesochorus confusus Hlgr.
M. dimidiatus Hlgr.
Poyntzpass, emerged in May from pupae of *Pteronus pavidus* Lep.

BRACONIDAE.

Apanteles obscurus Nees.—Tempo—both sexes bred by Sir C. Langham from *Melitaea artemis*. The cocoons of the fly were separate from chrysalis of butterfly, silver white in colour and the fly emerged from the end.
Rhogas geniculator Nees.
Microgaster globatus Nees.
Earinus gloriatorius Pauz.
Portnoo, June.
A female of the last named had its hind coxae rufous.

Acton Glebe, Poyntzpass.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

JANUARY 30.—ANNUAL GENERAL MEETING, held (by kind permission) in the Lecture Theatre of the Royal Dublin Society. The President (SIR FREDERICK MOORE) took the chair. The Secretary (Prof. G. H. CARPENTER) proposed the adoption of the Report for 1918, of which a summary follows :—

The year 1918 has been, like its near predecessors, a time of much difficulty for the Society. It has been impossible to avoid further depletion of the stock ; yet much encouragement has been afforded by the support of members in various ways, and the conclusion of the armistice in November, followed by the removal of at least many of the war-conditions prevalent for four years past, gives cause for hopeful confidence.

The increase in the gate receipts noted in the Report for 1917 has been well maintained during 1918, the amount being £1,764 14*s.*, as compared with £1,600 2*s.* 3*d.*, an increase of £164 11*s.* 9*d.* The revival in the number of visitors thus shown is particularly encouraging in the absence of any unusual cause of attraction, like the great frost of February, 1917.

An increase in membership has again to be recorded : the year has been signalised by the accession of twenty-five life-members, thirty-six annual members, and five garden subscribers. The amount paid in members' entrance fees and subscriptions was £666 7*s.*, as compared with £657 13*s.* in 1917. The increase is less than might have been expected, but, unfortunately, some annual members have not renewed their subscriptions.

In spite of the increase in the Society's income from the gate receipts and membership fees, the financial position in the autumn appeared unpromising on account of the great advance in the prices of food-stuffs and fuel, even as compared with the prices during 1917. It was also found both just and necessary to raise further the wages of most of the keepers. The Council decided, therefore, that another special appeal to the members and friends of the Society could not be avoided if the year were to close without a heavy debt. As a possible alternative to a direct request for money contributions, it was suggested that a Fete, lasting three or four days, might be held in the Gardens during the summer of 1919. By means of a circular letter and a special general meeting, held at the Royal College of Surgeons (by kind permission of the President and Council) on November 14th, the opinion of the Society's members was asked, with the result that an immediate appeal for contributions for the clearance of the debt has been made, and a Fete, to be held in the Gardens in June is being prepared for. The amount already subscribed towards the extinction of the debt is £250 ; for this generous support the Council desire to return hearty thanks to the donors. This amount

includes over £5 sent in as voluntary gifts by various members during the earlier months of the year, before any suggestion for a special appeal had been considered. The year closed with a deficit of only £86, as compared with £385 at the end of 1917.

No changes of importance have taken place in administration during the year. Repairs have been kept within the limits of absolute necessity, and no new building work has been undertaken. For the usual three vacancies on the Council, General Sir Joseph Byrne, Chief Inspector of the Royal Irish Constabulary ; Prof. James Craig, of the Royal Veterinary College ; and Mr. W. Barrington Jellett have been nominated.

It has always been the Council's practice to offer respectful welcome to each incoming Irish Viceroy. Lord French was good enough to consent to visit the Gardens in order to receive an Address on the afternoon of July 8th, and the occasion was celebrated by a successful Garden Party.

As already stated, it has been decided to organise a Fete in the Gardens during June (on the 11th, 12th, 13th and 14th, Wednesday to Saturday of Whitsun week, inclusive). The Council did not take this important step until assurance of support had been received from many members : it is cheering to record that a sum of £300 has already been paid or guaranteed towards the expenses. Some such effort is regarded as advisable, because the Council wishes not only to extinguish the debt but to obtain a substantial sum of money—£3,000 is aimed at—which will be available for necessary reconstruction accompanying the return to peace conditions. Animals will soon come into the market, and ought to be purchased, and extensive renovation of several of the existing buildings and enclosures is highly desirable for the sake of the health and comfort of the animals. The Council is entrusting the details of the Fete to an influential Committee, including many ladies. Mr. A. Miller, Royal College of Surgeons, has kindly consented to act as Honorary Secretary of this Committee, and any communications about the Fete, contributions towards its expenses, or promises of help will be gratefully received by him (such should not be sent to the Secretary of the Society). Contributions will also be gladly accepted by either of the Honorary Treasurers of the Fete Committee—the Right Hon. Jonathan Hogg and Mr. C. Wisdom Hely.

Further depletion of the stock in the Gardens has again been a feature of the year's changes. There is, however, every reason to hope that, with a speedy revival of imports and the anticipated increase in the funds at the Council's disposal, a marked improvement in the collections will soon be apparent. Meanwhile it has been considered advisable to make use of some of the vacant paddocks for the display of useful domestic breeds of Goats and Poultry. The importance of Goats as a source of auxiliary milk supply and of Poultry, whether for egg production or flesh-food, justifies the establishment of such exhibits. Poultry are especially attractive as suitable live-stock for householders with small ground, whether in town or country. Six Goats of the favourite Anglo-Nubian and Toggenburg breeds are already on view. The Poultry

exhibit is in process of formation, and the Council would acknowledge gratefully valuable help from the Department of Agriculture in its inception and realisation.

The Anthropoid Apes are now represented only by the two Chimpanzees, "George" and "Charlie"; the Hoolock Gibbon died at the end of October, having lived in the Gardens almost "for the duration of the war." The death of the Woolly Monkey in April deprived the collection of its last American type, but an interesting series of the African Guenon group (Cercipothecus) renders the Monkey House still attractive to visitors. Especially noteworthy was a specimen of the rare Schlegel's Guenon (*C. neglectus*) from the Congo district, on deposit by Mr. McBride, from May until November.

The stock of older Lions and Lionesses remains as at the close of 1917. Three litters of two each were born during 1918—from "Red Hugh" and "Maive" in January, from "Finn" and "Hassanatu" in May, and from "Oseni" and "Sheila" in September. Unfortunately, the last-named family died quickly after birth, and the May couple survived only for a few months. The "Oseni"—"Sheila" cubs of July, 1917, also had died early in 1918. Five other cubs were exported during the year for sale and exchange, so that the total stock now consists of fourteen animals, seven of either sex.

The stock of Carnivora generally has suffered through the deaths of the old Tiger (in January), our last Puma, from pleurisy (in March), our last Leopard (in June), the Serval (in September), and the old Timber Wolf (in December). The last-named had lived in the Gardens for twelve years.

The exhibit of breeds of Domestic Goat, which has been already referred to, will, it is hoped, prove attractive as well as useful. The family of Bornean Zebus was increased by the birth of a fine calf in August. On the other hand, the death of the Llama in December leaves a gap in the collection of herbivores that may not be filled for some time.

A number of Belgian "Hares" have been added to the collection of Rodents, and it is hoped that some success may be achieved in the breeding of these fancy Rabbits. A species of American marsupial—the Murine Opossum—rarely to be seen in zoological gardens, was acquired in February, and lived in the Monkey House until midsummer. It was a rather delicate little beast, retiring in its habits.

Several thousand Trout eggs were kindly given in January by Lord Dunraven. Most of these were reared, and the young fishes were, in April, handed over to Colonel Cane for replenishment of the waters of the Upper Liffey.

To the regret of the Council, no entries for the Photographic Competition were received during 1918. Now that restrictions on the use of cameras have been removed, it is to be expected that interest in this pursuit may revive. The Council has further decided to establish annual competitions in painting, drawing and modelling animals from the life. Such competitions used to be held under the Society's auspices sixty years ago, and it is hoped that the step now taken for encouraging work of the

kind may tend to advance both in art and in the study of Natural History. The classes proposed are—(1) Sculpture, including modelling, carving, &c.; (2) Drawing and Painting; (3) Designs for Decorative Art from Animal Forms. All work must be done from live models, but not necessarily in the Zoological Gardens. Full conditions of the competitions may be obtained by application to the Secretary, and a circular embodying the Rules will shortly be sent to Schools of Art throughout the country. It is proposed to hold in October, 1919, an exhibition in the Haughton House of the sculptures, paintings, drawings and designs submitted by the candidates.

The adoption of the Report was seconded by C. WISDOM HELY, and carried, and the Officers and Council, as nominated, were declared elected.

A. MILLER made a statement with regard to the proposed Summer Fete, and PROF. J. A. SCOTT delivered an interesting lantern lecture on Birds now and formerly in the Society's collection.

DUBLIN MICROSCOPICAL CLUB.

JANUARY 8.—The Club met at Leinster House. Dr. G. H. PETHYBRIDGE exhibited specimens and microscopic slides illustrating the disease known as "firing" in flax, from material collected at Garvagh and Dunmurry. Although this term is used somewhat indiscriminately in the North of Ireland for more than one specific disease of the flax plant, yet, in the main, it is applied to cases of attack by the rust fungus, *Melampsora lini*, or an allied species. The uredospores occur as orange-coloured pustules on the leaves and stems, and in this stage the disease is generally called "rust." The teleutospore stage causes the development of black areas on the stems, frequently encircling them, and extending to half an inch or more in length. The development of these blackened areas on the flax stems seriously interferes with the production of fibre from them; and they are said to be "fired." W. B. Grove, in "The British Rust Fungi," 1913, p. 357, says, "fortunately the parasite seems not to occur in the Irish flax-fields," but this statement now requires modification. It certainly does occur; but reliable information as to its distribution and economic importance in this country has yet to be obtained. *M. lini* is quite common on *Linum catharticum* in Ireland, but it seems probable that the species of Melampsora which occurs on cultivated flax (*L. usitatissimum*) in Ireland as elsewhere is not identical with that found on the Purging Flax. Possibly it may be *M. liniperda* Köenicke, but the point requires investigation, and it is hoped that more light will be thrown on the matter during the coming year.

D. MCARDLE exhibited *Lejeunea ovata* Tayl., a very minute plant, of a pale yellow colour, the leaves have the apex of the antical lobe accuminate, with peculiar under-leaves or stipules deeply divided, almost triangular,

from a broad sinus ; in this way and other characters it differs from every other British Lejuenea ; it resembles *L. hamatifolia,* which was exhibited for comparison ; it has the margin of leaves coarsely serrated which in *ovata* are plain. *Lejeunea ovata* on account of the peculiar stipules, etc., takes its place with about eighteen species of South American plants under the name of Harpa-lejeunea. The specimens exhibited were bearing the characteristic perianths, and were collected at Annascaul, Co. Kerry, in June, 1898. It is very rarely found in this condition. There is a note in Pearson's work on the Hepaticae of the British Isles, p. 43, relating to this plant—" I have never met with perianths of this species, nor had Dr. Spruce ; the description of the perianth is taken from the Synopsis Hepaticarum."

BELFAST NATURALISTS' FIELD CLUB.

NOVEMBER 19.—The Winter Session opened with a Conversazione, held in the Carlton Hall, about 212 friends and members being present. A large number of exhibits—zoological, botanical, geological, and archaeological—were on view.

One of the most interesting exhibits showed the results of six months' work by the Strangford Lough Survey Committee. It included geology, botany, archaeology and zoology. The geological exhibit comprised a fine range of drift erratics from the various islands in the lough visited during the summer session of 1918.

After tea the President, A. McI. Cleland, took the chair, and in the course of his remarks said that some of their original members were still with them, though the club was founded almost fifty-six years ago. During the evening Joseph Robinson and A. McDowell were selected as ordinary members, Geoffrey G. Quick and Kenneth J. Quick junior members of the Club.

DECEMBER 17.—CHARLES BULLA gave an address entitled " The Bronze Age in Ulster." The President (A. McI. CLELAND) occupied the chair.

The paper dealt largely with burial customs during that period. Not the least interesting part of the lecture was the criticism of the " urns " contained in the Belfast Free Library Museum, with Lord Abercromby's notes sent here for the better elucidation of our local collection, thus making it of greater interest to visitors. In the discussion which followed R. MAY drew attention to the fact that people expect to find gold in the urns, and this was the reason they were often destroyed. A whole cemetery of these urns was found near Moira some time ago, only a few of which were rescued. Miss ANDREWS commented on the fact that some of the pottery makers belonged to a " short " race. A hearty vote of thanks was then accorded Mr. Bulla for his very interesting and instructive lecture. The meeting terminated with the election of Miss G. Smyth, Miss McKibben, and Miss N. Roden as associate members of the Club.

DUBLIN NATURALISTS' FIELD CLUB.

SEPTEMBER 21.—EXCURSION TO PORTMARNOCK.—A party of twenty-five met at Amiens Street and proceeded to Portmarnock by the 1.50 train, favoured by beautiful weather. Walking to the estuary, the object of the excursion, the Velvet Strand, was reached. Owing to the lateness of the season, very few birds were seen, some Oyster-catchers and Dunlins alone calling for observation. Through the action of a recent on-shore gale an abundance of sub-littoral shells had been cast up, and the examination of these occupied the party for the next two hours. Proceeding towards Malahide by the sea-walk, the botanists collected, on the banks bordering the road, several uncommon plants—Wild Mignonette, Hound's-tongue, Hairy Violet, Sweet Violet and Bog Pimpernel. On the opposite side of Malahide estaury, the conductor, G. C. May, pointed out the nesting ground of the Common, Arctic and Lesser Terns, which, owing to the protection given in the breeding season, had increased prodigiously. The party returned to Dublin by the 6.30 train.

OCTOBER 12.—EXCURSION TO LUCAN AND LEIXLIP.—A party of eighteen, conducted by W. F. Gunn joined in this excursion. The 12.30 tram was taken to Lucan, and in beautiful weather the conductor led the party through the demesne. Here the autumn colouring and the beauty of the Liffey in high flood delighted every one. On leaving the demesne, the party went to the Salmon Leap, which was looking its very best owing to the large quantities of water pouring over the fall. After tea in Leixlip, the excursion returned to Lucan through St. Catherine's farm, a way new to most of the members. The chief object of the excursion was to search for Mycetozoa, of which the following species were discovered :—*Trichia varia* Pers., *Arcyria denudata* Sheldon, *Physarum nutans*, sub-species *leucophaeum* Pers., *Didymium squamulosum*, Fr. The conductor having kindly offered a lens to the collector of the largest number of species of Mycetozoa, it was awarded to Miss Sheila Sanderson.

NOVEMBER 21.—J. DE W. HINCH (President) in the Chair. The evening was devoted to exhibits, among which were the following :—PROF. COLE, F.R.S. : Maps illustrating the physical divisions of the British Isles. J. DE W. HINCH : Varieties of Irish Granite. R. Ll. PRAEGER : Specimens of *Lathyrus maritimus* (Sea Pea) from Co. Kerry and *Trichomanes radicans* (Killarney Fern) from Co. Carlow.

DECEMBER 21.—J. DE W. HINCH (President) in the chair. Mr. G. C. MAY lectured on the Birds of Ireland, and illustrated the lecture by a number of lantern slides. The lecture was discussed by the President, R. Ll. Praeger, and H. W. D. Dunlop.

NOTES.

BOTANY.

Irish Plants.

In the *Journal of Botany* for December, 1918, the editor (Mr. James Britten) contributes a note on "*Juncus effusus spiralis*," *Dabeocia polifolia* var. *alba*, and *Ulex hibernicus* (U. *strictus* Mackay) drawing attention to some notes on these plants in Ireland which might easily be overlooked.

ZOOLOGY.

Abnormal Caterpillar of Choerocampa.

In the note (*I.N.* for December, 1918, p. 172) on an abnormal caterpillar of Choerocampa there is an error for which I am unable to account. In assuming the Sphynx attitude, one pair of ocelli being hidden by the contraction of the segments, there remained visible, in the specimen described, not *six*, but only four of the eye-like markings, which gave to the creature an extremely uncanny appearance.

W. E. Hart.

Kilderry, Co. Donegal.

The Jay in Westmeath.

Having just read in the *Irish Naturalist* for December (vol. xxvii., p 174) an interesting note on the Jay in Co. Longford, I feel sure that the following observations may be of interest. With regard to this species in Westmeath, as far as I can ascertain, there seems to have been a steady increase during the last four years. I refer not only to the augmentation of numbers, but also to extension of range. When first quartered at Mullingar barracks (November, 1917), I found this bird established in various localities, but nowhere extensively. By the autumn of 1918 a marked increase had taken place, this being especially noticeable by the shores of Loughs Ennell and Owel (where copses of hardwood trees are in evidence).

On the 19th April, 1918, I observed a pair of Jays close to Edgeworthstown (Co. Longford), and two days later a single bird beside the railway between Street station and Inny Junction (this near the border of and in Co. Westmeath). Again, on the 5th May, 1918, I had the fortune to find a single specimen near Cloonshannagh (Co. Longford). The above examples, together with Mr. Wilson's evidence, tend to show that not only has *Garrulus glandarius* penetrated into Co. Longford, but also, in all likelihood, it is resident there.

G. S. Beveridge.

Mullingar Barracks.

SOME IRISH MYCETOZOA.

BY W. F. GUNN.

ABOUT two years since, a copy of Part 63 of the Clare Island Survey, dealing with the Mycetozoa of the island and of Ireland generally, came into my possession, and on reading it, I learned for the first time of the great difference between the number of species recorded from Ireland, as compared with those known in England and Scotland. I noticed also that some of the sub-provinces were almost a complete blank, apparently having been little searched for these organisms. I therefore concluded that I might extend the list of species and their distribution by collecting any which came under my notice, and the following list is the result.

Many of the Mycetozoa are very minute and require not only careful looking for, but fairly keen eyesight to detect. A good many of those noted below were found while from home on business when the only time I could give to them was a passing look over any decaying stump or likely habitat which caught my attention while driving through the country. In the majority of cases, those which I have found are fairly easy to see, either by reason of the plasmodium or ripe sporangia being brightly coloured, or by growing in a crowded mass.

There seems to be no reason, so far as I know, why the number of species which exist in Ireland should not approximate to that recorded from Great Britain. Further search is therefore likely to reveal the presence of species at present unknown, and to extend the distribution of those which have only a few (in some cases but one) stations assigned to them.

The determination of species sometimes presents difficulties owing to the presence of intermediate forms, and careful examination and some degree of skill in microscopic manipulation is necessary. It is therefore a great pleasure to me to acknowledge the ready help which those experts to whom I have applied have shown me. The courtesy of their replies, often entailing troublesome examination of

material, has been a happy experience, and without their aid, this list could not have been published. To Mr. Huish, F.R.M.S., London; J. H. Howard, Norwich; and Mrs. Stelfox, of Bangor, I am greatly indebted. Miss G. Lister has been extremely kind, and my thanks are due to her in a special measure for useful hints, and for looking over many of my specimens. I should add that on several occasions when collecting in the vicinity of Dublin I had the pleasure of the company of Mr. W. N. Allen and Mr. David McArdle, both of whom contributed to the collections made.

One of the most prolific of my hunting-grounds—the estate surrounding Rathfarnham Castle—is now rapidly being destroyed. The trees are being felled and the ground built over. Except where otherwise stated the specimens have been found on dead wood, such as decaying stumps of trees, rotten logs, or fallen branches.

One x denotes a new county record; two xx a new sub-provincial record (according to Mr. Adams' sub-division of the country); and three xxx new to Ireland.

Ceratiomyxa fruticulosa McBride.—CLARE—x Sixmilebridge. WEXFORD—xx Johnstown Castle; Gorey. QUEEN'S COUNTY—x Ballyfin; Portarlington. WICKLOW—Bray; Shillelagh; Rathdrum; Ovoca; Dargle.

The specimen gathered by Stanley Gunn at Bray was of yellowish pale buff or Apricot colour. All the others of the more usual pure white.

Badhamia utricularis Berkeley.—CLARE—xx Kilkishen. KILDARE—x Monasterevan. DUBLIN—Blackburne Estate, Rathfarnham. Generally on decaying fungi.

Badhamia panicea Rost.—GALWAY—xx Near Galway, on moss. QUEEN'S COUNTY—xx Abbeyleix.

The Galway specimen was found on a thick coating of moss on the vertical stem of a tree stump in full sunshine, about 2 feet from the ground.

Physarum nutans Persoon.—QUEEN'S COUNTY.—x Abbeyleix demesne. DUBLIN—Rathfarnham (on leaves of grass); Howth demesne (on moss on decaying stump); Lucan woods.

Physarum nutans Pers. sub-species **leucophaeum** Lister.—CLARE—xx Kilkishen, on moss. WICKLOW—xx Ballyarthur, Ovoca, on moss. DUBLIN—xx Rathfarnham.

Physarum didermoides Rost.—DUBLIN—Bushy Park, Terenure (on moss).

Fuligo septica Gmelin.—TIPPERARY SOUTH—Cahir. KILKENNY—xx Bennettsbridge. QUEEN'S COUNTY.—Ballyfin; Portarlington.

GALWAY S.E.—xxx Woodlawn (var. *candida*) (on moss on tree stump). WICKLOW—Glendalough; Rathdrum; Ballydungan (on moss). DUBLIN—Marley Grange.

Note by Miss Lister:—I call it *F. septica* var. *candida*. The spores are rather darker than is typical for *F. septica* and measure 7 to 9 μ. The character of the long slender lime knots and abundant straight hyaline threads is right for *F. septica*. We have often been puzzled with forms intermediate between var. *candida* and *F. cinerea* var. *ecorticata*, but your specimen comfortably lies on the *F. septica* heap, I think.

Didymium squamulosum Fries.—DUBLIN—Killiney (on Chestnut and Oak leaves); Lucan (on Oak leaves). Bushy Park, Terenure (on Beech leaves).

Stemonitis fusca Roth.—WICKLOW—Rathdrum. DUBLIN—Howth; Rathfarnham (on Polyporus).

Stemonitis fusca Roth var. **confluens** Lister.—DUBLIN—xx Howth.

Gathered in the plasmodium stage, large masses of several square inches in area. Miss Lister reports "a very confluent form,—most instructive in its strange elastic network, and very slight development of columellae."

Stemonitis splendens Rost. var. **flaccida** Lister.—WICKLOW—xx Shillelagh.

Stemonitis ferruginea Ehrenb.—DUBLIN—xx Rathfarnham.

Comatricha nigra Schroeter.—DUBLIN—Glendhu.

Comatricha elegans Lister.—QUEEN'S COUNTY—xx Portarlington.

Comatricha typhoides Rost.—DUBLIN—Howth demesne; Rathfarnham.

Enerthenema papillatum Rost.—QUEEN'S COUNTY.—Ballyfin. WICKLOW—Powerscourt. KILDARE—Monasterevan.

Brefeldia maxima Rost.—DUBLIN—xx Near Dodder river, Rathfarnham (Stanley Gunn).

The only other record from Ireland is from Malone, near Belfast.

Cribraria argillacea Persoon.—DUBLIN—xx Howth woods; Marley Grange; Rathfarnham.

Cribraria rufa Rost.—DUBLIN—x Howth demesne.

Cribraria aurantiaca Schrader.—WICKLOW—x Shillelagh; Powerscourt; Rathnew.

The Powerscourt specimen showed great variation in the form of net, from that of *C. aurantiaca* with broad flat branching nodes to almost typical *C. tenella*.

Dictydium cancellatum McBride.—WICKLOW—Belmont, Bray (Stanley Gunn); Shillelagh xx (var. *fuscum*). DUBLIN—Rathfarnham.

Tubifera ferruginosa Gmelin.—WICKLOW—Rathdrum; Ovoca. DUBLIN—Rathfarnham.

Both the Rathdrum and Ovoca specimens developed from yellow plasmodia, which is less common than the white form.

Dictydiaethalium plumbeum Rost.—DUBLIN—Rathfarnham.

Reticularia Lycoperdon Bulliard.—KERRY NORTH—xx Listowel. CORK EAST—xx Glanmire. LIMERICK—x Docks, Limerick. KILKENNY—xx Bennettsbridge. DUBLIN—Killiney Hill; Howth demesne; Rathfarnham.

Lycogala epidendrum Fries.—KERRY NORTH—Listowel. TIPPERARY NORTH—x Cappawhite. WEXFORD—xx Enniscorthy. QUEEN'S COUNTY—x Portarlington; Ballyfin. GALWAY N.E.—Athenry. WICKLOW—x Shillelagh; Glendalough; Ballydungan; Enniskerry; Rathdrum. DUBLIN—Glendhu; Beaufort, Rathfarnham; Howth demesne.

Trichia affinis De Bary.—QUEEN'S COUNTY.—x Abbeyleix (on moss); Portarlington. KILDARE—x Moore Abbey, Monasterevan (on moss). WICKLOW—Ashford; Ovoca. DUBLIN—x Lucan (on moss); Rathfarnham; Howth (on moss); Killakee.

Trichia persimilis Karst.—WICKLOW—Ovoca. DUBLIN—x Howth; Bushy Park, Terenure.

Trichia scabra Rost.—KILKENNY—xx Bennettsbridge. DUBLIN—xx Howth; Rathfarnham.

In these gatherings a large number of sporangia were present, crowded together on a common membranous hypothallus measuring 5 to 10 or 12 square inches in area.

Trichia varia Persoon.—WATERFORD—xx Cappoquin. KERRY—xx Listowel. KILKENNY—xx Bennettsbridge. QUEEN'S COUNTY—x Abbeyleix; Portarlington; Ballyfin. KILDARE—x Moore Abbey. WICKLOW—Rathnew. DUBLIN—Killakee; Glendhu; Clontarf; Rathfarnham; Lucan; Howth.

Trichia decipiens McBride.—QUEEN'S COUNTY—x Ballyfin. KILDARE—x Moore Abbey. DUBLIN—x Howth.

Trichia Botrytis Persoon.—DUBLIN—x Howth demesne.

Hemitrichia Vesparium McBride.—WICKLOW—xxx Glen of the Downs.

The first record from Ireland. Considerable quantities were found on heaps of decaying sawdust near the Delgany entrance.

Arcyria ferruginea Saut.—DUBLIN—xx Lucan.

Arcyria cinerea Pers.—WEXFORD—xx Gorey. WICKLOW—Dargle; Shillelagh.

Arcyria denudata Sheldon.—KERRY NORTH—Listowel. CLARE—x Kilkishin (on moss). KILKENNY—xx Bennettsbridge; near Kilkenny. WEXFORD—Enniscorthy. QUEEN'S COUNTY—x Portarlington; Abbeyleix demesne. GALWAY WEST—Near Galway. DUBLIN—Howth; Rathfarnham; Portmarnock; Killakee; Lucan.

Arcyria incarnata Persoon.—CLARE—xx Kilkishin (var. *fulgens* Lister). DUBLIN—x Rathfarnham (both the type and var. *fulgens*); Bushy Park, Terenure.

Arcyria nutans Greville.—WICKLOW—Shillelagh. DUBLIN—x Luttrellstown.

Perichaena corticalis Rost.—DUBLIN—x Rathfarnham.

The only specimens which I have found were growing upon the rugged bark of a large fallen trunk of an Elm and were almost indistinguishable in colour. Their presence was only revealed by the yellow appearance of some sporangia which had been partly eaten by Woodlice.

25 Brighton Square, Rathgar.

THE IMPORTANCE OF RATS AND MICE.

BY PROF. GEORGE H. CARPENTER, D.SC.

A PAMPHLET[1] of modest size recently issued by the Trustees of the British Museum, in which Mr. M. A. C. Hinton deals with the importance of Rats and Mice in relation to human health and industry, is worthy of study by all naturalists who appreciate the value of zoological research from the economic standpoint. As Dr. S. F. Harmer remarks in his preface, "it is not sufficiently recognised by the majority of the community how great" is "the extent of the damage done to essential food supplies by these small mammals," which are also "enemies of mankind" because of "their agency in the dispersal of some of the most serious diseases which affect the human race."

The largest section of this valuable little book is occupied with a description of the two common species of Rat—the "Black" and the "Brown"—found in association with mankind. Mr. Hinton favours generic subdivision so as to call these respectively *Rattus rattus* and *Rattus norvegicus*; the House Mouse is the only Britannic species for which he retains the familiar *Mus*. A point of general biological interest comes out in the account of the sub-species of *R. rattus*; the technical "type-form," with its black fur, "is essentially characteristic of the cold northern countries of Europe," and is in reality a modification of "a bright-coloured soft furred stock," represented by the many local sub-species which abound in India and Burma—countries whence *R. rattus* has spread widely over the globe through the exchanges of commerce. Irish naturalists will be interested to see that Mr. Hinton regards the black variety of the Brown Rat—the famous *Mus hibernicus* of William Thompson—as a parallel case of colour-modification apparently under climatic influence. "This black race," he writes, "is becoming commoner and is acquiring a wide distribution."

[1] "Rats and Mice as Enemies of Mankind." By M. A. C. HINTON. British Museum (Natural History) Economic Series, No. 8. Pp. 64, with 2 plates and 6 text-figures. London, 1918. Price 1s.

In his account of the habits of the two species Mr. Hinton points out that while *rattus* " is essentially an arboreal or climbing animal," *norvegicus* " is essentially a water-loving and burrowing animal—it drinks freely, and displays great skill as a swimmer and diver." Hence it abounds along watercourses and in drains and sewers. The rat population of Great Britain has been estimated as approximately equal to the human population, and the damage caused by rats in the destruction of foodstuffs in farmyards, granaries and storehouses amounts to £10,000,000 or £15,000,000 a year. The access of rats from sewers and other filthy haunts into dwelling-houses affords abundant opportunity for the spread of disease, and that these rodents through their fleas transmit bubonic plague to mankind is now well known.

Several pages are devoted to a discussion as to the possibility of exterminating rats, and Mr. Hinton concludes that " the work of destruction, to succeed, must be undertaken simultaneously all over the country—and it must be continued so long as a breeding stock of rats remains." Systematic trapping and poisoning may do much, and " the fullest protection should be afforded to all Stoats, Weasels, Owls and Kestrels." The House Mouse, though less noxious than the Brown Rat, is very destructive to food-stores and a possible carrier of disease ; every effort should be made to reduce the population of mice as well as of rats. Mr. Hinton's discussion on the " Balance of Nature" and the protection of Carnivora appeals to all naturalists. He emphasises how the ignorant war waged against so-called " vermin " leaves no effective check on the high fecundity of rats and mice—originally alien species—which " has been developed apparently to enable them to survive the many attacks to which they are exposed."

The pamphlet concludes with notes on the structure and classification of the Muridae, with a key to the British species. This is illustrated by clear figures of the skulls and teeth of the animals. Mr. Hinton remarks on " one of the most astonishing features in the distribution " of the sub-family Microtinae, " that, although remains of lemmings occur in great abundance in the Pleistocene cave-deposits of Ireland, there is apparently no trace at all of either fossil or living Voles in that country."

IRISH SOCIETIES.

DUBLIN MICROSCOPICAL CLUB.

FEBRUARY 12.—The Club met at Leinster House.

W. F. GUNN (President) exhibited a preparation of one of the numerous sugar substitutes which have been offered to the public, under fancy names, during the period of sugar shortage. Microscopical and chemical tests proved it to consist for the most part of wheat starch, with which a very small percentage of a crystalline substance—probably saccharin—had been incorporated.

J. N. HALBERT showed a new genus and species of Acarina found amongst decaying seaweed on the shore at Malahide. The genus belongs to the Seius group of the Gamasidae and is distinguished from allied genera by the fact that both the dorsal and ventral surfaces of the body are continuously chitinized, with the exception of the leg region. The sternal plate is obsolete, a rare feature in the Acarina. The mite has also been found on the south-west coast of England.

D. MCARDLE showed *Lejeunea Macvicari*, Pers., bearing the peculiar oval-shaped smooth perianths and amenta which are formed of about three pairs of altered leaves which contain the oval shaped antheridia. The former distinguishes it from any known European species which have the perianth more or less plicate. He has not succeeded in finding the plant in Ireland; among those found here it has affinities with the curious *Lejeunea diversiloba*, Spruce, in the obtuse or oblong-oval apex of the leaves and in cell structure but is widely separated by the absence of the lobule in many of the leaves, and above all by the rigid texture of the stems. The specimens exhibited were found in May, 1899, on old Elm stems in a ravine, Allt Allan, Moidarb, West Inverness by Mr. S. McVicar, an excellent authority on Hepaticae. It would be interesting to find it in Co. Kerry, the only known station for *Lejeunea diversiloba*.

W. N. ALLEN showed slides of Hepaticae :—*Metzgeria furcata*, *Frullania dilatata*, *Plagiochila asplenoides* and *Lophocolea bidentata*, mounted in glycerine jelly treated with potassium bichromate by the method devised by him and described in *Knowledge* for September, 1910. The slides, mounted over nine years ago, were in a perfect state of preservation, showing the practical utility of the process.

SIR FREDERICK MOORE exhibited a flower-bud of the rare Australian sundew *Drosera auriculata*, a slender-growing, climbing species. The sepals, unlike those of other sundews, are covered with highly-coloured tentacles.

MARCH 12.—The Club met at Leinster House, the President (W. F. GUNN) in the chair.

Prof. G. H. CARPENTER showed a preparation of the jaws of a male specimen of *Bibio marci* in which a curious reticulated structure of the surface of the cuticle is apparent on the lower aspect of the antepenultimate

segment of the maxillary palp. The appearance suggests the existence of some underlying sense-organs.

H. A. LAFFERTY exhibited microscopic preparations of the fungus *Typhula phacorrhiza* (Reich.), the sclerotia of which were found, at the Seed Testing Station of the Department of Agriculture and Technical Instruction for Ireland, to occur as an impurity in several samples of home-saved flax seed. The sclerotia which are very minutely wrinkled on the outside have a black cortex but are hyaline internally. They are spherical or discoid in shape and vary from 1·5 to 3 mms. in diameter. Germination takes place by each sclerotium producing a single slender whitish stalk varying from 4 to 6 cms. long which becomes slightly thickened for 1 cm. or so at its apex. On the sides of this thickened part of the stalk the basidia sterigmata and basidiospores of the fungus are produced. Preliminary infection trials have been carried out with the basidiospores of the fungus on the cotyledons of young flax plants, and these would indicate that it is not parasitic, at least on flax plants, but further research is necessary to definitely determine this point. This is the first record of *Typhula phacorrhiza* for Ireland.

BELFAST NATURALISTS' FIELD CLUB.

JANUARY 21.—The President (A. McI. CLELAND) occupying the chair. Professor YAPP, M.A., then gave an address entitled "The Fenland of East Anglia and its Vegetation." In ancient times the fenland was a great swampy plain, now it has been drained, and the whole face of the country is changed. There are still a few undrained spots, the lecturer drawing attention to the vegetation of one of these, viz.:—Wicken Fen, ten miles north of Cambridge. The vegetation is influenced by the character of the peaty soil. In places large tree trunks are exposed, the tops of which all incline to the north-east; therefore we can conclude that the prevailing winds have not changed in direction since early times—that is, from the south-west. Professor Yapp also dealt with the plants, which came under three heads—aquatic, semi-aquatic, and those growing on the Fen itself. Proceeding, he said it was found that species growing side by side have different requirements as regards air and water, and so place their roots at different levels. Rushes grow with their roots in water, higher up we get sedges, then mosses, and on the humus formed from the decay of the latter seedlings take root. *Spiræa Ulmaria* is a dry fen plant, and establishes itself in this way. By a series of beautiful lantern slides Professor Yapp showed how Spiræa was able to withstand drought. The bottom leaves being smooth, the upper ones showing a varying degree of hairiness, transpiration was thus consequently lessened. In the discussion which followed many interesting points were raised, Dr. Charlesworth, Mr. Cleland, and Mr. Stelfox taking part. The lecture was illustrated by a series of fine lantern slides. The meeting terminated with the election of Mr. Strain as an ordinary, Mr. McBride an associate, and Mr. Bent a junior member of the Club.

FEBRUARY 18.—A lecture on "The Warfare of Animals" was delivered by Professor G. H. CARPENTER, the President (A. McI. CLELAND) in the chair.

In the course of a description, illustrated by lantern slides, of animal life and habits, Professor Carpenter said that although a study of the structure of animals revealed that weapons were very prominent, the supposed parallelism between the struggle for existence among animals and human warfare was really very slight. There was a great gulf between the struggle for existence as Darwin conceived it and modern warfare. The weapons of the beast of prey were not those of the soldier, but were used principally for procuring food. The warfare of animals was directed more against circumstances and surroundings and drawbacks of life than against other creatures. Nature taught us that final victory was not with the lion but with the lamb, and there was no biological justification for such human warfare as that from which we had just been delivered.

On the proposition of N. H. Foster, seconded by Professor Yapp, a cordial vote of thanks was passed to Professor Carpenter.

NOTES.

BOTANY.

Asplenium Adiantum-nigrum var. acutum.

Just before my paper on this fern was published in the February number of this Journal (p. 13 *supra*), I had an unexpected opportunity of visiting the collections at Kew and the British Museum, and can now supplement my account with some notes on the extra-Irish distribution of this plant. As regards Great Britain, the large series of the species in the British Museum shows that a much less amount of variation from the type prevails there than in Ireland. Almost all the specimens from whatever part of England, Wales, or Scotland are normal or nearly so; the only specimen approaching *acutum* is from Berkshire (between Luckley and Wokingham); it is well on the way to my f. *lineare*, though not sufficiently extreme to be referred to that form.

Abroad, *A. Adiantum-nigrum* has a very wide range over the Old World—from Norway to Cape Colony and the Himalayas, and it is extremely variable. Among the many variants, the specimens referable to var. *acutum* are readily picked out, and these group themselves, like the Irish forms, around the two extremes which I call f. *lineare* and f. *ovatum*. The distribution of these two extreme forms is rather interesting. Of the former, good specimens were noted from Madeira, Canaries, and Lydia. The plant has thus a discontinuous "Lusitanian" range—S.W. Ireland, Atlantic Islands, Eastern Mediterranean. The Lydian example is very interesting. It is labelled "Lydia: in monte Megosis supra oppidum Tire" and was collected by Bornmüller in 1906

(Herb. Kew). The station is S.E. of Smyrna, and the plant quite typical. The most extreme plants are from Madeira and Kerry. The f. *ovatum*, on the other hand, has a wider range, just as it has in Ireland—Germany (Trier), Madeira, Sicily (Palermo), Corfu, Cyprus, south Syria, Phoenicia. The occurrence of this form so far north as Trier is interesting. The specimen was collected by C. Baenitz in 1868 (Herb. Brit. Mus.). Specimens which are good *acutum*, somewhat intermediate between f. *lineare* and f. *ovatum*, were noted as from Algiers and Hawaii; and specimens from Mentone approach *acutum*.

Luerssen, in his full account of the species as found in Central Europe (Rabenhorst's "Kryptogamen-Flora," vol. 3, pp. 260-282), recognizes the two forms of *acutum* referred to above, while not separating them, and sets down the linear form as rare. His figure (125 *b*) represents good *ovatum*, to which no doubt should be referred most if not all of the stations which he mentions, situate in South Tirol, Hungary, Croatia, Dalmatia, and Istria.

I may add with reference to the figures of the two forms accompanying my paper that, though they are drawn with accuracy, nevertheless the impression given by a comparison between good specimens of the two forms is of a greater amount of difference than is evident in the plate—the ultimate segments of the one appearing more ovate, and the other more linear, than in the figures.

R. Lloyd Praeger.

Dublin.

ZOOLOGY.

A Wasps' Nest.

At the beginning of last summer a lady who lives in the little hamlet of Queensboro', near the mouth of the Boyne, took down her winter curtains and hangings and caused some of them to be stored away for the summer in a large wooden box or chest. This chest was kept in an unused room; it had no lid, and a window in the room was always open. About the middle of October she required the curtains and hangings, and sent a servant for them. The servant returned and reported a bad smell from the chest. The lady had it emptied, and found at the bottom of it, under about two feet of tapestry and woollen curtains and hangings, a wasps' nest. The wasps were dead, so she could examine it in safety. A few days later I chanced to meet her. She told me her tale, and kindly gave me the remains of the nest and about a dozen of the deceased wasps. I am not an entomologist, but I know enough about wasps to perceive that the case was somewhat out of the common, so I sent the nest and wasps to Dr. Scharff. He was much interested and advised me to send an account of the case to the *Irish Naturalist*. The nest was small, the largest comb being about 4 inches in diameter, and it was made after the usual pattern of wasps' nests, roughly globular, and the combs connected by pillars or

struts. The cells and the wasps were both uncommonly small. I have taken hundreds of wasps' nests, both underground and hanging, but never saw such small wasps before. There was a queen among them, and she was small in proportion. The nest was entirely constructed of the curtains and hangings, which were a good deal chewed up and damaged in the process (rather to their owner's annoyance). It was a good deal broken up in getting it out, but some of the combs were entire and were very curious and pretty. The colours and the material of the curtains were very plain still, though they had been converted into *papier maché*, and they made a sort of variegated pattern on the backs of the combs very difficult to describe, but rather like the crown of an ornamental straw hat. However, Dr. Scharff hopes to exhibit the nest in the National Museum, so that visitors may see them for themselves. He consulted Mr. Halbert, who says the wasps are certainly *Vespa vulgaris*, but uncommonly small. Mr. Halbert has also looked up the literature on the subject of wasps' nests and can find no reference to a similar case.

G. H. Pentland.

Black Hall, Drogheda.

Argynnis aglaia in Co. Waterford.

The first time I saw *Argynnis aglaia* in this neighbourhood was in 1901, when I captured four specimens, two male, and two female. I think if specimens had occurred about here before that, I must have seen them, for I have always been on the look-out for anything new or uncommon. Since then the species has increased in numbers. I have never seen *Thecla betulae* near here: so we have a disappointing record with regard to that species about Portlaw as compared with that of Mr. Moffat at Ballyhyland, Co. Wexford. Nor has *Thecla rubi* come under my observation about here, although we are only about 20 miles from Cappagh where it is noted by Kane as abundant. *Thecla quercus* used to be found here pretty commonly some years ago, but I have not noted it latterly.

William W. Flemyng.

Coolfin, Portlaw.

Glaucous Gull at Sandymount.

Mr. Croker Barrington, a keen observer of birds, informs me that he saw a Glaucous Gull at Sandymount, towards the end of January last. This Gull is rarely seen in Ireland.

George C. May.

13 Fitzwilliam Square, Dublin.

The Two-barred Crossbill.

Among the original notes of William Thompson's first volume of the "Natural History of Ireland" I recently came across a beautifully hand-coloured drawing of the Two-barred Crossbill, *Loxia bifasciata* (C. L. Brehm), the work of the late Robert Templeton in 1802. This drawing is mentioned by Thompson in his "N. H. of I.," vol. i., p. 283, as being that of a bird from "Grenville, near Belfast, January 11th, 1802." Grenville is a locality I have never been able to fix, but a note in Thompson's own writing, accompanying the drawing, gives the locality as *Greenville* which is in the Bloomfield district of Belfast, and in County Down. This therefore definitely determines the locality of the first recorded example of this bird in the British Isles. Furthermore in the same note Thompson says, "Having seen Mr. T's. [Templeton's] drawing of this bird I may add that it compares with the *female* as described by Bonaparte." Thus for the first time (as far as I can ascertain) is the sex given. The late Mr. Howard Saunders in his "Manual of British Birds," p. 203, gives *May 11th*, 1802, as the date of the bird's occurrence. This is, of course, incorrect, as proved by Thompson's own statement, and should read January 11th. I rather fancy Saunders mixed up his species with that of the Parrot Crossbill (*Loxia pytiopsittacus*) obtained in May, 1802, and mentioned by Thompson in vol. i., p. 282. There seems to have been a coloured drawing of this bird as well, but I have not been able to trace it; there is not the slightest doubt that the drawing I have seen refers to *L. bifasciata* and not to the latter. The drawing with Thompson's original notes to his first volume belong to the collections of the Belfast Natural History and Philosophical Society and are now in this museum.

J. A. Sidney Stendall.

Municipal Museum, Belfast.

The manuscript copy of the "Natural History of Ireland," which is preserved in the National Library, and which in point of time succeeded the original notes to which Mr. Stendall refers, agrees with the latter in giving *Greenville*, not *Grenville* as the locality where the bird in question was obtained; so *Grenville* appears to have been a printer's error. As regards the sex of the specimen, this was mentioned in the first published record of its occurrence, in the "Extracts from the Minute-book," *Trans. Linnean Society*, vol. vii. (1804), p. 309. I quote the entry:—"Dec 20, 1803. Mr. Templeton, A.L.S., of Orange-Grove near Belfast, in a letter to Mr. Dawson Turner, F.L.S., mentions that the White-winged Crossbill, *Loxia falcirostia* of Latham, was shot within two miles of Belfast, in the month of January, 1802. It was a female, and perfectly resembled the figure in Dixon's "Voyage to the North-west Coast of America."

R. Lloyd Praeger.

National Library, Dublin.

LEPIDOPTERA COLLECTED IN IRELAND BY LIEUTENANT R. E. CUSACK.

BY J. N. HALBERT, M.R.I.A.

THE following paper contains a record of butterflies and moths collected in various Irish localities by the late Lieutenant R. E. Cusack. We are indebted to his father, Mr. E. Cusack, for information concerning the early training of this promising young naturalist, who was only twenty-two years of age at the time of his lamented death. He was educated at Aravon, Bray, and at Aldenham School in Hertfordshire. After leaving the latter school he entered Trinity College, Dublin, in January, 1914, and he studied zoology also at the Royal College of Science. Shortly after the outbreak of the war he obtained a commission in the Fourth Battalion of the Royal Dublin Fusiliers, but before he had the opportunity of going abroad with his regiment he was prostrated by an attack of pneumonia which proved fatal.

It is clear that Lieutenant Cusack began collecting insects while still a schoolboy at Bray, but the great majority of his captures were made during the seasons of 1913 and 1914 when the study was taken up in a thorough-going manner. Even the smallest kinds of moths were assiduously collected, and there are many notes and some excellent drawings of their life-histories in his diaries. It is gratifying to find that his collection received the most careful treatment; all the specimens are carefully labelled with the place and date of capture, which is very fortunate, as this young entomologist had not reached the recording stage of his work. It is, therefore, desirable that there should be a definite record of his many interesting captures.

Lieutenant Cusack collected in at least four of our Irish counties, but most of his insects are from the Bray district. The heather-clad slopes and woods of Bray Head were favourite hunting-grounds, and as examples

of uncommon insects found there one may refer to the Clouded Yellow Butterfly (*Colias edusa*), the Oak Beauty (*Amphidasys strataria*), the Scarce Umber moth (*Hybernia leucophearia*), and the night flying moths *Panolis piniperda*, *Epunda lichenea*, and *Hadena protea*. When Mr. W. F. de V. Kane published his "Catalogue" of Irish butterflies and moths he was of opinion that Birchall's Wicklow record of the Hadena was based on mistaken information, while the Hybernia seems to have been in need of confirmation as an Irish insect, so that the rediscovery of these two insects by Lieutenant Cusack is very satisfactory.

In order to avoid the repetition of county names in the list it may be well to detail the chief localities mentioned. The following are in the Bray district :—The Glen of the Downs the Great Sugar Loaf, Kilmacanogue, and The Quill. Kilmacanogue marsh is a swampy piece of ground on the right hand side of the road leading to the Glen of the Downs yielding some interesting forms of the Marsh Fritillary (*Melitaea aurinia*). The Quill is a fair sized wood, chiefly of oak and birch floored with bracken and heather at the base of the Great Sugar Loaf Mountain ; here were found the Wood Tiger (*Nemeophila plantaginis*) and *Plusia interrogationis*.

Errislannan is a district of heather and bog lying immediately south of Clifden in county Galway, worked during the summer holidays of 1913. An interesting point noted here was the occurrence of many larvae feeding on the Sweet Gale (*Myrica Gale*), including those of the Ruby Tiger (*Spilosoma fuliginosa*), the Emperor (*Saturnia pavonia*) and *Acronycta menyanthidis*, an unusual food plant for the two first-mentioned insects.

A few insects were collected at Merlin Park, near Galway, an excellent locality for lepidoptera frequently referred to by Mr. Kane. A notable capture in this park is a pair of *Nemophora cupreacellus*, a beautiful little moth not previously known to occur in this country. Inishmore is the largest of the Aran Islands in Galway Bay.

Only the less abundant butterflies and moths are recorded in the following list, though some common species are also

included on account of the interesting varieties which were found. In the case of the small moths, known as the "Microlepidoptera," it has been thought advisable to record all of Lieutenant Cusack's captures as so little is known of their distribution in this country. Indeed the study of these interesting and often beautifully coloured insects has been greatly neglected in Ireland, and comparatively little advance has been made since Birchall's time, so that accurate local lists are greatly needed. Many of the microlepidoptera were unnamed in the collection; these, and indeed all of the species, have been carefully re-examined, and I am much indebted to Mr. J. H. Durrant, F.E.S., of the British Museum, for kind help in their identification; such species as were seen by him are marked with an asterisk in the list. Quite a number of these small species are unrecorded from the Dublin and Wicklow district, and at least twelve are apparently additions to our known Irish fauna.

There has probably been an extension in the range of certain pine-feeding moths into the district due to the planting of coniferous trees in recent years. The following insects may be mentioned in this connection:—*Panolis piniperda, Bupalis piniaria, Eupithecia togata, Eupithecia lariciata* and *Retinia pinivorana,* and it is interesting to notice that none of these insects are to be found in Birchall's "Catalogue of the Lepidoptera of Ireland," which was published in the year 1868.

A great many changes have recently been made in the names of our native lepidoptera, more especially amongst the smaller moths where well-known names have been altered. Unfortunately our leading entomologists are not yet agreed about the correct names for many species, so, with a few exceptions, it seems best to follow the nomenclature and arrangement of Mr. Kane's "Catalogue of the Lepidoptera of Ireland," thus facilitating reference for those who are not interested in questions of priority.

Through the kindness of Mr. E. Cusack, this collection of insects is now preserved in the Irish National Museum.

RHOPALOCERA.

Pieris napi L.—The collection contains some interesting specimens of the "Green-veined White" found chiefly in the Bray district. Amongst these is a beautiful yellow form captured in a field between the Great Sugar Loaf and the road to Kilmacanogue on the 4th June, 1913. This specimen is a female and it greatly resembles the variety *flava* Kane, but is of a paler tone, while the spots on the fore wings are rather blurred and are only slightly darker than the grey of the nervures, the latter are rather heavily dusted with dark scales. The underside is like that of the typical form; in var. *flava* the yellow areas equal the upper side in depth of colour. A figure of the last named variety will be found in Mr. Kane's "Catalogue of the Lepidoptera of Ireland."

There are a few examples of the summer form *napaeae* Esper, in which the females have strongly blackened wing—tips, larger spots and darker nervures, the spots showing through very distinctly on the underside of the wings. Both sexes were found at Bray Head in July, and at Errislannan in Galway in September. There is also a primrose coloured female taken at Kilmacanogue marsh on the 24th May with the nervures and spots of a uniform pale grey resembling a Scotch variety figured by Mr. Barrett ("Lepidoptera of the British Islands," 1, plate 3, fig. 1 *c*), except that the spots are weaker in the Irish specimen. A very small male, measuring only 35 mm., caught in April in the same locality may also be mentioned.

Euchloe cardamines L.—Both sexes of a small form of the "Orange Tip" were captured at Kilmacanogue marsh on the 21st May, 1913. The wing expanse is only 36 mm.

Colias edusa Fb.—One male captured on Bray Head in July, 1904.

Gonopteryx rhamni L.—North side of Merlin Park in County Galway, 1st September, 1914; and observed about three miles from Galway along the east shore of Lough Corrib (Diary, 3rd September, 1914).

Melitaea aurinia Rott.—A series of this interesting butterfly, the local "Marsh Fritillary," was found at Kilmacanogue marsh between the 13th and 28th June, 1913. Most of the specimens are the prevalent Irish variety *praeclara* Kane, the chief features of which are the sharply marked contrast between the red-fulvous and the straw-coloured areas of both wings, and the intensified dark markings. In the Kilmacanogue specimens the fulvous sub-terminal bands of the fore wings show little trace of the paler spots usual in this variety. There are also a few females of the variety *scotica* Kane, and at least one of a form with the black reticulation of the wings even more marked than in *praeclara*, and the straw-coloured patches are more or less tinged with fulvous resembling some examples of typical English *M. aurinia*. Colonies of the caterpillar of this butterfly are also recorded in Mr. Cusack's diary as having been found in Merlin Park and at Errislannan in county Galway.

Vanessa io L.—The Peacock butterfly is noted in Mr. Cusack's diary as having been unusually common at Bray Head during September, 1911, and it was captured at Clontarf in 1906; also at The Quill in September, 1913. A large colony of the larva was seen at Courtown Harbour, County Wexford, in July (Diary 1914).

V. cardui L.—Bray Head; Merlin Park, Galway; two freshly emerged specimens were seen on Inishmore in Galway Bay on 27th August (Diary 1913).

Satyrus semele L.—Rather dark and distinctly marked specimens at Bray Head.

Epinephele tithonus L.—A series captured at Kinsale, County Cork, 24th August, 1913.

Thecla quercus L.—Noted as quite common on the north side of Bray Head flying about ash trees during July and August (Diary).

Th. rubi L.—The Quill and Bray Head, May.

Polyommatus phloeas L.—A pale form found at Bray Head during May, 1913. The variety with the black spots near margin of front wings almost obsolete is also represented from the same locality, August, 1912.

Lycaena icarus Rott.—There is one male example of the variety *icarinus* Scriba, found at Bray Head in June, 1913. It occurs occasionally with the typical form in Ireland.

L. argiolus L.—Taken at The Quill and Kilmacanogue marsh in May. Has been recorded from Powerscourt and the Dargle in the same neighbourhood.

L. minima Fues.—Bray Head cliffs, 27th June, 1914. A rather local species in the Dublin district, I have taken it on railway embankments at Blanchardstown and Sutton, at Tallaght, and on the sandhills at Malahide in May and June.

Nisoniades tages L.—Merlin Park, one full-grown larva, 20th August, 1914; Salthill, "three half-grown *tages* larvae at night" and "Limestone heath on eastern shore of Lough Corrib, four *tages* larvae" (Diary 30th August, 1914). All of these localities are in county Galway, which appears to be the headquarters of this butterfly in Ireland.

SPHINGIDAE.

Choerocampa porcellus L.—Bray district, July.

C. elpenor L.—Captured at Red Valerian, Bray.

Macroglossa stellatarum L.—Very common at Bray in 1905 (Diary).

SESIIDAE.

Trochilium crabroniformis Lewin.—The pupae of this clearwing were found in sallows in a swamp at Kinsaley, near Malahide. It occurs in poplar trees in the adjoining Portmarnock district.

ZYGAENIDAE.

Zygaena pilosellae Esp.—Mr. Cusack notes the occurrence of larvae of this local species at Merlin Park, near Galway, on the 20th August, 1914 (Diary). Apparently these larvae were not reared as there are no specimens of the moth in the collection.

BOMBYCES.

Sarrothripa revayana, Tr.—One specimen beaten from ivy near the top of Bray Head in July, 1912. A silvery-grey form with a black basal streak, an indistinct costal blotch, and unspotted wings suggesting the variety *degenerana* Hb. The species does not seem to have been definitely recorded from the Dublin district, but it occurs, as at Lucan, near Dublin.

Nudaria mundana L.—Bray Head cliffs, July, 1914.

Nemeophila plantaginis L.—One captured at The Quill on 30th June, 1913, and seen at the same place on other occasions. This species is little known in the Dublin district, though it is included in the Dublin list of 1878.

Spilosoma fuliginosa L.—Fairly common at Bray Head in 1904; there is a specimen of the ordinary red form in the collection from this locality. Errislannan, "found about 15 larvae of *fuliginosa* at different times most of them feeding on *Myrica Gale* (Sweet-gale) at night" (Diary, August, 1913).

Hepialus hectus L.—Taken in Bray district (Diary).

Poecilocampa populi L.—One specimen at Malahide, County Dublin.

Lasiocampa quercus L., var. **callunae** Palmer.—Taken at Bray Head.

Saturnia pavonia L.—Errislannan, "nineteen larvae mostly nearly full-fed on *Myrica Gale*" (Diary). A nice series of moths were bred from these larvae, the females being of a grey tone with little or no trace of the rosy tints usually present in this species.

Lophopteryx camelina L.—Found at rest on oak trees at Bray Head.

Notodonta ziczac L.—Errislannan, June.

Pygaera pigra Hufn.—Bred from larvae found at Errislannan.

NOCTUIDAE.

Acronycta menyanthides Vw.—Larvae found on *Myrica gale* at Errislannan, Lough Inch and Oughterard, in county Galway.

Leucania conigera Fb.—Common at Kinsaley, county Dublin, July.

Mamestra persicariae L.—Bred from Errislannan larvae, May.

Miana arcuosa Haw.—Bray Head, July.

Stilbia anomala Haw.—Merlin Park, near Galway, in August.

Noctua dahlii Hb.—Taken near Clifden, in county Galway.

Triphaena fimbria L.—Near Malahide (Diary).

Amphipyra pyramidea L.—One at Clontarf, near Dublin.

Panolis piniperda Panz.—The "Pine Beauty" moth was found at rest on pine trees at Bray Head on the 22nd April, 1913, also bred from pupæ from the same locality. I have found it at Glendalough in

April. Mr. Kane refers to it as a local species possibly introduced with pines, and consequently extending its range in this country.

Taeniocampa pulverulenta Esp.—Bred from pupæ found at roots of oak trees at Bray Head; emerged 17th March, 1913 (Diary).

Xanthia flavago Fb.—One at Killough in the Rocky Valley, and at Clontarf near Dublin.

Polia chi L.—Errislannan, found at rest on rocks, September.

Epunda lichenia Hb.—Captured on the Bray Head cliffs in September and October. A new locality for this pretty moth; it is known to occur at Howth, and the only other Irish locality mentioned by Kane is Rossbeigh, in county Kerry.

Hadena protea Bork.—There is an entry in Mr. Cusack's diary of the capture of two moths which he "believed to be *Hadena protea*" on pine trunks at Bray Head. The specimens are in his collection and they are undoubtedly the present species; they are labelled as having been taken on the 12th September, 1912. In one specimen the ground colour of the fore wings is very pale, so that the darker markings contrast strongly. Apparently little is known of the occurrence of this moth in Ireland. Mr. Kane refers to it as follows:—"Mr. Dillon records the capture of one at Clonbrock, the only Irish locality, as Birchall's record of its being found commonly on Wicklow was founded on mistaken information." Mr. Cusack's discovery of the species is therefore very satisfactory, and it must now be re-established as a native of the district.

Xylocampa areola Esp.—Bray Head cliffs in April.

Xylina ornithopus Rott.—Bray Head, and at Glenmalure, County Wicklow.

Habrostola triplasia L.—Bray district.

Plusia iota L.—One at Kilmacanogue; also near Malahide in July.

P. interrogationis L.—One specimen caught at The Quill at the base of the Great Sugar Loaf, 8th July, 1913. The species does not seem to have been definitely recorded from the Dublin and Wicklow district.

Chariclea umbra Hufn.—Bray district, two specimens. Kane records this rather rare species from Howth and Greystones; Mr. F. H. Walker took it at Dollymount last summer, and I have also met with it on the Malahide sandhills.

Zanthognatha tarsipennalis Tr.—Bray district.

Z. grisealis Hb.—Clontarf, in July.

GEOMETRIDAE.

Rumia luteolata L.—A specimen of this common moth with white hind wings was captured at The Quill in May, 1914.

Odontopera bidentata Clerck.—A small series from Bray Head including a uniformly brown form with indistinct lines, and one of a pale ochreous ground colour and distinct lines similar to that figured by Mr. Barrett ("British Lepidoptera," vol. vii., plate 289, fig. 1 *e*.).

Phigalia pedaria Fb.—One found in the Bray district.

Amphidasys strataria Hufn.—The following note is in Mr. Cusack's diary under 27th February, 1913:—"Male *Amphidasys strataria*, wings did not expand, from pupa dug under oak, Bray Head." A local species in Ireland, has been found at Glenmalure and Woodenbridge in county Wicklow (Kane, "Lepidoptera of Ireland," p. 97).

A. betularia L.—Two specimens from pupae found at Bray Head.

Boarmia repandata L.—This common and variable moth is represented by some interesting specimens. Amongst these are a few of a deep brown colour closely resembling the richly marked south of England form, though the ground colour is of a less warm tone, the strigae are present if somewhat blurred, the pale submarginal band is shaded with darker colour on its inner margin, and the hind wings have a distinctly marked median band. There are two male examples of the dark-banded variety *conversaria* Hb., captured on the Bray Head cliffs in June and July; one of these is in fresh condition and the ground colour of the wings is of an uniformly dark tone showing no trace of the usual broad pale bands, resembling the form figured by Barrett ("British Lepidoptera," plate 314, fig. 1 *e*), but without the dark submarginal band on the hind wings. Mr. Kane records this fine variety from a few Irish localities including Howth and Greystones in the Dublin district; in England it occurs chiefly in the south-western counties. The variety *distrigaria* Hw., is also represented.

Gnophos obscuraria Hb.—Bray Head cliffs, at rest on rocks, July.

Geometra papilionaria L.—One specimen of this beautiful and scarce species was found at Kinsaley, in County Dublin. Birchall records it from the Wicklow district, and I have taken it in the Deerpark at Powerscourt.

Acidalia marginepunctata Goze.—Several on Bray Head cliffs in July.

A. subsericeata Haw.—Bray Head in June and July.

A. immutata L.—Newcastle fen, county Wicklow, in June.

A. remutaria Hb.—Glen of the Downs, and The Quill, May.

Halia vauaria L.—One specimen at Bray Head in July.

Panagra petraria Hb.—Bray Head, May.

Selidosema ericetaria Vill.—Errislannan in August.

Bupalis piniaria L.—Males of this pine-feeding geometer were found at Bray Head at the end of June, and females were bred from pupae found in the same place in December, these emerged on the 17th April, 1913. A local species in Ireland and known to occur in county Wicklow, as at Glendalough.

Aspilates gilvaria Fb.—Two specimens of this scarce species were caught at Oranmore in county Galway on the 14th August, 1914.

Hybernia leucophearia Schiff.—One male found on a tree trunk at Bray Head on 15th February, 1914. It is of a pale cream colour, with distinct transverse lines and the mottling of the fore wings is very faint. This capture is of interest as Mr. Kane considers that the species needed verification as a native of Ireland. He remarks

"This insect is recorded in Birchall's list as common, but I have seen no Irish specimen, though it has been stated to occur at Waterford; of which confirmation is desirable" ("Lepidoptera of Ireland," p. 108).

Oporabia dilutata Schiff.—A few specimens of a silvery-grey form found at Bray Head in October. These are provisionally referred to the present species though they closely resemble some specimens collected by Mr. Kane and identified as *autumnaria* by Mr. Prout.

Larentia multistrigaria Haw.—Bray Head cliffs, end of February.

L. salicata Hb.—Bray Head cliffs, May to August.

Eupithecia plumbeolata Haw.—Two specimens at The Quill, May, 1914.

E. pygmeata Hb.—One at Bray, June, 1913.

E. indigata Hb.—A few at Bray Head, 23rd May, 1913.

E. lariciata Frr.—Found at rest on rocks at Bray Head in April, and reared from pupae.

E. togata Hb.—One specimen on the cliffs at Bray Head. Both this and the preceding species are pine feeders and are possibly introduced through the planting of coniferous woods. They are not included in Mr. Birchall's Irish list published in 1868.

Lobophora carpinata Bork.—Bray Head, on pine trunks, March.

Hypsipetes sordidata Fb.—Bred from larvae found at Newcastle fen in county Wicklow. Including a dark form with a pale central band on the fore wing (var. *fusco-undata* Don.).

Melanthia albicillata L.—Glen of the Downs and Bray Head, and at Errislannan, May to August.

Melanippe hastata L.—Bred from Errislannan larvae, May.

Anticlea nigrofasciata Goze.—Bray Head, at rest on tree trunks, May.

Coremia designata Hufn.—Bray Head.

C. ferrugata L.—Sugar Loaf and Bray Head cliffs, May and June.

Phibalapteryx vittata Bork.—Errislannan, September.

Cidaria fulvata Forst.—Inishmore in Galway Bay, August; a richly coloured form at Clontarf, county Dublin.

PYRALIDES.

Scoparia cembrae Haw.—Bray Head cliffs, July.

S. truncicolella Sta.—Bray Head, July and August.

S. angustea Steph.—Bray Head, September and October.

Scopula ferrugalis Hb.—Aran Isles; Kinsale, county Cork; and Errislannan, August.

Botys ruralis Scop.—One specimen bred from a pupa found at Bray Head, July, 1913.

PTEROPHORIDAE.

Platyptilia Bertrami Rossl.—One at Bray Head, July.

P. isodactylus Zell.—Errislannan, September.

CRAMBIDAE.

Crambus pascuellus L.—Bray district.

PHYCIDAE.

Phycis dilutella Steph.—Bray Head cliffs, July.
Ph. fusca Haw.—Bray district, May and June.
Nephopteryx spissicella Fb.—There is a single example in the collection labelled "Arklow, in a D. S. E. Railway carriage." Recorded from Kerry and Galway.
Aphomia sociella L.—Bray Head cliffs, July; Errislannan in August.

TORTRICIDAE.

Species marked with an asterisk have been examined by Mr. J. H. Durrant, F.E.S.

Tortrix podana Scop.
T. rosana L.
T. heparana Schiff.
T. ribeana Hb.
} Bray Head and district, June and July.

T. corylana Fab.—Two specimens, one bred from a larva found at Bray Head, 14th June, 1913. This species is not included in Kane's list, but Barrett says it is common in the south of Ireland, and it has also been taken near Enniskillen.
T. viburnana Fb.—Errislannan, including a richly marked reddish brown form, August.

T. palleana Hb.
T. viridana L.
T. fosterana Fb.
Dichelia grotiana Fb.
} Bray Head, June and July.

Amphysa gerningana Schiff.—Arran Isles in August.
***Peronea sponsana** Fb.—Bray Head in September and October.
P. schalleriana L.—Bray Head, and Errislannan.

P. comperana Hb.
P. perplexana Bar.
} Errislannan in July and August.

P. variegana Schiff.—Bray, and Kinsale, county Cork, in September and October.
P. hastiana L.—Errislannan, September and October. A few specimens including one which emerged with only three wings from the pupa.
***P. ferrugana** Tr.—Bray Head and Glen of the Downs in September and October.
P. asperana Hb.—Oranmore, Moycullen, and Errislannan in county Galway, August and September.

Rhacodia caudana Tb.—Killough, Wicklow, September.
Teras contaminana Hb.—Bray Head, and The Quill.
Dictyopteryx holmiana L.—Near Galway, August and September.
D. bergmanniana L.—Bray district, July.
Argyrotoza conwayana, Fb.—Bray Head and Kilmacanogue.
Ptycholoma lecheana L.—A small series from Bray Head, June, 1914. A little known species in Ireland, has been recorded from Cork, Kerry, and Fermanagh.
Diluta semifasciana Haw.—A small series captured at Errislannan, county Galway, in August, 1913. This is an addition to Mr. Kane's list, but it has been found in Connemara by Canon Cruttwell, and also at Louisburgh in Mayo during the Clare Island Survey.
***Penthina corticana** Hb.—There is a fine example of this birch-feeding Tortrix in the collection. It was found at The Quill at the base of the Great Sugar Loaf Mountain in June, 1914. The species has not been previously recorded from Ireland; in Great Britain it occurs as far north as Ross-shire, but seems a local species.
P. betulaetana Haw.
P. pruniana Hb.
***P. variegana** Hb.
} Bray Head, June and July. Including the var. *nubiferana* Hw., of the last named species.
P. marginana Haw.—Errislannan, August.
Pardia tripunctana Fb.
Sericoris littoralis Curt.
S. urticana Hub.
S. lacunana Dup.
Cnephasia musculana Hb.
Sciaphila subjectana Gn.
S. virgaureana Tr.
} Bray district.
Bactra lanceolata Hb.—Bray district, and Errislannan.
***Phoxopteryx inornatana** H.-S.—One specimen at Errislannan in August. Not previously recorded from Ireland. The species occurs in fens and bogs in Great Britain, ranging from the south to Sutherland (Barrett, xi., p. 116).
Ph. lundana Fb.—Bray Head cliffs, May.
***Ph. mitterbacheriana** Schiff.—The Quill, June.
Grapholita ramella L.
G. subocellana Don.
G. penkleriana Fisch.
} Bray district.
***Phlaeodes tetraquetana** Haw.—The Quill, May.
***Ph. immundana** Fisch.—Bray Head, May.
Batodes angustiorana Haw.—Bray Head, May and June.
Ephippiphora cirsiana Zell.—Kilmacanogue and Wicklow fens, June.
E. pflugiana Haw.—Common in the Bray district.
E. inopiana Haw.—Bray Head and The Quill, small specimens ranging from 15-17 mm. in expanse, May. Rather a local species found in damp places on fleabane (*Inula dysenterica*). Recorded from Armagh.

E. trigeminana St.—Bray Head, May to July.

Olindana ulmana Hb.—Bray Head and Glen of the Downs, July. There are a few records of this species from the north and west of Ireland.

Retinia pinivorana Zell.—One specimen taken at Bray Head in July, 1914. Has been recorded from counties Galway and Down.

***Coccyx splendidulana** Gn.—Taken at Bray Head, 28th May, 1913. This species was apparently omitted from Mr. Kane's "Catalogue," but it was recorded from Limerick in the supplement to Birchall's List published 1873.

***C. proximana** H.S (*distinctana* Bent.).—Bray Head, July, 1913. Has been taken by Colonel Partridge at Enniskillen.

Stigmonota perlepidana Haw.
S. regiana Zell.
Catoptria ulicetana Haw.
} Bray district.

***C. juliana** Curt.—One specimen at Bray Head, 11th July, 1913. The larvae is said to live in acorns and edible chestnuts, "leaving them when they fall to spin up in or under the bark of trees." Mr. Durrant places this species in the genus Pamene, while in Barrett's work it figures under Carpocapsa. Not previously recorded from Ireland.

Trycheris aurana Fb.
Symaethis oxyacanthella L.
Eupoecilia nana Haw.
E. atricapitana St.
E. angustana Hb.
} Bray district.

Xanthosetia hamana L.—Bray, and Salthill, county Galway.

Aphelia osseana Scop.—Aran Isles and Errislannan, August.

TINEIDES.

Diurnea fagella Fb.—Common on tree trunks at Bray Head, Malahide, and Glenmalure in March and April. One emerged from a pupa found in a rolled-up leaf on the 1st February.

[***D. phryganella** Hb.—The occurrence of this allied though much rarer species at Portmarnock, county Dublin, is worth recording here. A single specimen was beaten from a willow tree at the pond on Mr. Trumbull's fields in the early part of October, 1917, by Mr. F. H. Walker, who has kindly presented the specimen to the Irish National Museum. The only previous Irish record is Belfast, where it was taken by Mr. C. W. Watts some years ago. The larva lives between the joined leaves of oak trees, and the moth appears on the wing during October and November; according to Mr. Meyrick it is common in England ranging as far north as Westmoreland.]

Fumea intermediella Brd.—Very common on the cliffs at Bray Head, and on the Great Sugar Loaf. The moths appear in May and June.

Scardia cloacella Haw.
Blabophanes rusticella Hb.
***Tinea misella** Zell.
T. pallescentella Sta.
***T. pellionella** L.
***T. merdella** Zell.
Tineola biselliella Hml.
} Bray district.

Lampronia luzella Hb.—Two specimens at Bray Head. Recorded from Howth and Belfast.

Incurvaria muscalella Fb.—Bray Head, common, April and May.

I. pectinea Haw.—Glen of the Downs, and The Quill, May. Has been found at Killarney (Kane).

***Eriocephala calthella** L.—Bray Head and Kilmacanogue, May and June.

***E. aruncella** Scop.—Bray Head, June and July.

E. aureatella Scop.—Glen of the Downs, June.

Micropteryx subpurpurella Haw.—Bray Head, April and May.

***Scaeotes schwartziella** Zell.—Glen of the Downs, May and June. There are few Irish records of this species; it has been found at Lough Bray.

Adela rufimitrella Scop.—Bray Head and Kilmacanogue, June.

A. viridella L.—Bray Head, and The Quill, May.

***Nemophora cupriacella** Hb.—There are two examples, a male and a female, of this beautiful species amongst some "micros" collected by Mr. Cusack in Merlin Park, near Galway, in August, 1914. I cannot find a record of its occurrence in Ireland. It is said to be rather local in Great Britain, ranging from the south to Cumberland (Meyrick).

***Swammerdamia lutaria** Hw.—Found at The Quill, June, 1914. A common English species, yet this appears to be the first record for Ireland.

Hyponomeuta padella L.—Salt Hill, Galway, in August.

H. cognatella Hb.—Bray, bred from larvae found on apple, July.

Plutella cruciferarum Zell.—Bray Head, April to September.

P. porrectella L.—Bray, May and June.

Cerostoma vittella L.—Bray, one specimen, with well-marked spots on the inner margin, August.

***C. radiatella** Dnvn.—Glen of the Downs, September.

Harpipteryx xylostella L.—Moycullen, Oranmore, and Errislannan in County Galway, August and September.

Phibalocera quercana Fb.—Bray district, common.

Depressaria costocella Haw.—Bray Head, and Errislannan.

D. flavella Hb.—Salt Hill, Galway.

D. umbellana St.—Bray Head, and Kinsale, county Cork.

***D. purpurea** Hw.—One specimen at Kilmacanogue, April, 1914. Previously recorded from Wicklow Mountains and Clonmel (Kane).

D. ocellana Fb.—Errislannan, September.

D. applana Fb.—Bray district, and Salthill, near Galway, common,

***Depressaria depressella** Hb. (?).—A specimen found at Errislannan in September is doubtfully referred to this species by Mr. J. H. Durrant; the specimen is too much "worn" for accurate determination.

D. heracleana De G.er.—Bray, and Salthill, Galway.

Gelechia ericetella Hb.—Bray Head and The Quill.

***G. humeralis** Zett.—Bray Head, October.

***Endrosis lacteella** Schiff.—Bray Head, July, 1913.

Bryotropha terrella Hb.—Bray Head, June.

B. domestica Haw.—Bray, July.

***Lita instabilella** Hb.—Aran Isles, August.

L. artemisiella Tr.—Bray Head, July.

***Teleia proximella** Hub.—Two specimens at The Quill, May and June.

***Anacampsis anthyllidella** Hb.—Aran Isles, August.

Chelaria hubnerella Don.—One at the Knock River, near Galway, August.

Pleurota bicostella Clerck.—Two specimens at The Quill, June.

Dasycera sulphurella Fb.—Bray district, common.

Oecophora lambdella Don.—One specimen of this pretty species was found at Bray Head in July, 1913. It occurs locally in the south of England, and the only previously recorded Irish locality is Killarney. The larva lives in dead holly twigs.

O. pseudospretella Sta.—Bray and Errislannan.

Endrosis fenestrella Scop.—Bray Head.

Butalis grandipennis Haw.—Bray Head, and The Quill, in June and July. Recorded from Howth.

***Acrolepia granitella** Tr.—Bray Head, May.

Glyphipteryx thrasonella Scop.—Kilmacanogue and The Quill.

G. fischeriella Zell.—Bray Head, July.

Argyresthia ephippella Fb.—The Quill, June and July.

A. nitidella Fb.—One specimen, Errislannan, August.

A. semitestacella Curt.—Bray Head cliffs, September and October.

A. conjugella Zell.—Glen of the Downs, and The Quill, June.

A. retinella Zell.—The Quill, June and July.

***A. pygmaeella** Hb.—Wicklow fens, June.

***A. sorbiella** Tr.—The Quill, two specimens; and Enniskerry, June and July. Not previously recorded from Ireland. A local species ranging into Perthshire; the larva lives on the shoots of *Salix caprea*.

A. gaedartella L.—Bray Head, and The Quill.

A. brochella Hb.—The Quill, June and July.

***Gracilaria populetorum** Zell.—One specimen at The Quill, June, 1914. Not previously found in Ireland. Occurs locally in Great Britain, ranging north to Westmoreland (Meyrick).

G. alchimiella Scop.—Bray Head, and Glen of the Downs.

G. syringella Fb.—Bray Head, May.

Coriscium brongniartellum Fb.—Bred from larvae found at Bray Head, July. Recorded from Bray many years ago by W. F. Kirby; has also been found on the south coast of Ireland (Kane).

Coleophora albicosta Haw.
C. caespititiella Zell. } The Quill, County Wicklow.

***C. fuscedinella** Zell.—The Quill, June, 1914.

Laverna phragmitella Bent.—The pupae of this fen species were found commonly in the heads of Reedmace at Newcastle marsh near Wicklow, on the 26th June, 1914; the moths began to emerge on the 10th July. The larvae lives in the heads of Reedmace (*Typha*) causing them to droop; it is reported as locally common in Great Britain, ranging as far north as Yorkshire (Meyrick). I cannot find a previous record of its occurrence in Ireland.

***Elachista apicipunctella** Stn.—Two specimens at the Glen of the Downs, May, 1914.

***E. albifrontella** Hb.—Bray Head and Kilmacanogue, June, 1914. Both this and the preceding species appear to be unrecorded from Ireland.

***E. nigrella** Hw.
E. argentella Clerck. } Bray Head, and district.
E. rufocinerea Hw.

***Tischeria complanella** Hb.—The Quill, June.

***T. marginea** Hw.—One specimen at Bray Head, June.

Lithocolletis irradiella Scott.—Bray Head, larva on oak leaves.

***L. pomifoliella** Zell. (*L. oxyacanthae* Frey.).—Bred from Bray Head larvae.

L. ulmifoliella Hb.—The Quill, July.

L. quercifoliella Fisch.—Bray district, common.

L. alnifoliella Hb.—Bray Head, on alder, March.

L. cramerella Fb.—Glen of the Downs, and The Quill.

L. trifasciella Haw.—Bred from Bray Head larvae, May.

***L. viminetorum** Stn.—Glen of the Downs, May. Not previously recorded from Ireland.

***L. kleemannella** F.—One specimen at Kilmacanogue marsh, June. Not previously recorded from Ireland.

Lyonetia clerckella L.—Bray, July to October.

Cemiostoma laburnella Heyd.—Bred from larvae found at Bray. Not previously recorded from Ireland except from the Dublin district and Belfast by Prof. Carpenter (*Econ. Proc. R. Dublin Soc.*, vol. i., p. 608). It has been found also at Tullamore, King's County.

***Bucculatrix ulmella** Hb.
***Nepticula aurella** Fb. } Bray Head.

***N. splendidissimella** H.S.—One specimen found at Bray Head, April, 1914. Not previously recorded from Ireland. The larva lives in galleries in the leaves of Bramble.

National Museum, Dublin.

NOTES.

ZOOLOGY.

Argynnis aglaia in South Mayo.

Having seen two notes with regard to the Dark Green Fritillary in Ireland, I should like to mention that I met with it here last summer in August. Among some Silver-washed Fritillaries feeding on Scabious flowers, I saw a good female specimen of the Dark Green Fritillary. I was able to approach it closely and was, therefore, sure of its identity, though not having a net with me I could not capture it.

WILLIAM RUTTLEDGE.

Bloomfield, Hollymount, Co. Mayo.

The Jay in Co. Louth.

Jays have appeared in co. Louth several times this winter. The Dean of Armagh saw one (at Drumcar, I believe), my son saw one here on the 19th inst., and I have heard their cry twice. They are very rare visitors here.

G. H. PENTLAND.

Black Hall, Drogheda.

Gannets at Dunmore.

At the beginning of March a great number of Solan Geese appeared off Dunmore, co. Waterford, as I am informed by Miss Paul, evidently attracted by the unusual plenty of inshore herrings or sprats,on which they were continually plunging. The fishermen told her that twenty years ago there was a similar influx of fish, and then the Gannets were also to be seen in large quantities in pursuit of them.

J. H. GURNEY.

Keswick Hall, Norfolk.

Courtship of Birds.

Watching the birds about here in their early spring performances, one thing has puzzled me in regard to Herons, Hoodie Crows and Magpies. During the period of courtship *three* birds seem always to be present, but when once nest-building has been undertaken there are only two. This year I shot two Hoodie Crows that were persecuting the Herons, but very shortly three Hoodies were again in evidence, though they took care not to go near their executed comrades. I could not make out whether the three include two males or two females.

W. S. GREEN,

Caherdaniel, Co. Kerry.

The Rev. Charles W. Benson, LL.D.

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THE REV. CHARLES WILLIAM BENSON, M.A., LL.D.

It may be long before Irish naturalists again number in their ranks so widely known a personality as Charles William Benson, who, to the sorrow of innumerable friends in every walk of life, passed from amongst us, in his eighty-third year, on the 6th of February last. He was not a biologist in the sternly scientific sense of that exacting word; but he belonged to a still scarcer type, and one not less valuable, it may safely be said, to the cause of scientific progress.

The eldest son of John Benson, M.D., of Castlecomer, and of Elizabeth, daughter of Captain Fitzgerald, R.N., of Waterford, Benson was born in his father's county Kilkenny home on the 12th of July, 1836, and spent the years of his boyhood chiefly in the vicinity of Waterford, where he was sent to school, and where the love of nature, and particularly of birds, took strong and lasting possession of his young heart. He has left us in the preface to his book on Irish Song-birds some pleasing reminiscences of those early days—of the eagerness with which he crept through the Kilbarry bogs "to discover the possessor of the reed-like song" of the Sedge-Warbler, and of the delight which so filled his mind, when a book on birds was placed in his hands, that he was almost too agitated to be able to read it. That some older friends encouraged his taste is plain from the same narrative, but the boy's own nature was undoubtedly the main source, and it may be questioned whether any amount of discouragement would have killed his innate love of birds.

Benson's early years were not, however, years of much leisure, and his studies were necessarily concentrated on subjects less attractive than bird-life during his school and college days, and still more so at the beginning of the period that immediately followed them. He took his B.A. degree at Dublin University in the spring of 1859, and in the same year, with an enterprise truly remarkable, he started Rathmines School—built by himself, as he was fond of

recalling, at the age of 22, and destined to be the chief scene of his activity for the next forty years, by far the most important period of his long life. In 1860 he completed his divinity course in Trinity College (winning distinction as a Divinity Prizeman), and received ordination on June 29th. He held for a time the curacy of Sandford Church (1872) and Mulhuddart (1887-1900); but it was as headmaster of Rathmines that his name was chiefly familiar to the public.

In charge of what soon became a large and leading educational establishment (2,905 pupils through his hands, of whom four rose to be Bishops in the Church of Ireland and two became Fellows of Trinity College) in a neighbourhood far from unfavourable to bird-life, he not only returned with renewed zest to the study that had fascinated his childhood, but addressed himself with all the energy and insistent kindliness of his nature to the task of pressing the delights of that favourite study on the boys attending his school. The day had not arrived when promotion of "Nature Study" was to be advocated as it now is as one of the cardinal requirements of all good teaching. But if the doctrine now commonly accepted on that subject is a sound one few school-masters ever showed themselves more thoroughly in advance of their age than did Dr. Benson (he took the LL.D. degree in 1865) among his boys at Elm Park. As far, indeed, as he could he turned the school—in out-of-school hours—into a Field Club, and made it a practice on almost every Saturday to take parties of the boys on bird-rambles into various parts of the country round Dublin—Howth, Lucan, the Phoenix Park, Baltinglass and Blessington being amongst the favourite resorts. Lapse of time only strengthened this feature in the life of the school. A happy marriage in 1863 with Frances Harden brought him a numerous family, and of that family—twelve in number, of whom nine survive—it would appear that only one (Charlie) inherited much of his father's great enthusiasm for nature. But the companionship in taste of the one son proved a strong additional stimulus to that enthusiasm; while friendships formed with A. G. More, R. J. Ussher, and most of the leading

naturalists of Ireland, were a further cause of quickening to an activity little in need of a spur.

Benson soon came to be much in request as a popular lecturer on Irish birds, and in that capacity visited a good many parts of the country. During the school holidays he made a point of seizing opportunities for more distant "bird-rambles," and generally visited either Switzerland or Germany (sometimes Italy too) in the company of his much-loved son. The amount of information he accumulated in these expeditions, especially about the birds of Switzerland—always a favourite subject—must have been very considerable; and it will be of interest to many to know that he had a book on Swiss Birds (such a book as he had often himself felt to be a desideratum to tourists) ready for publication at the time of his death.[1]

The great sorrow that fell on Benson in 1884, in the death of the son who had for years been his inseparable companion, was a stroke from which, in the opinion of his family, he never fully recovered. Only those who knew the man well can realise what he suffered. But it may be said that those who love the study of birds as Benson himself loved it are gainers through the father's loss; for it was the inability that he now felt to go on delivering lectures that led him to embody many of his notes in a little volume, entitled "Our Irish Song-Birds."

The rapidity with which the first edition of this little book was bought up in 1886 is a tribute not often paid to publications of similar aim. But the tribute was thoroughly well deserved. "Our Irish Song-Birds" makes no claim to be a work of original information, though some of the passages detailing personal experiences are among the most interesting it contains. For example, the account of that remarkable scene on the banks of the Dodder, when Benson and a friend saw a Missel-Thrush rescue a Chaffinch from a hotly-pursuing Sparrow-Hawk,

[1] The Rev. W. F. Benson, rector of Templeshanbo, to whom I am indebted for many of the facts mentioned in this memoir, kindly informs me that the present unsettled state of the world, combined with the increased cost of paper, had determined his father to postpone publication of this book—which it is much to be hoped may yet see the light.

yields quite a dramatic corroboration to the theory independently advanced by a French writer, that the Chaffinch purposely builds its nest in the vicinity of a Missel-Thrush's, to secure protection for its family through the vigilance and courage of so powerful a neighbour. A feature of the book that must commend itself to most readers is the large number of easily accessible localities—especially around Dublin—that are named as favourite haunts of particular songsters. Apart, however, from the local and original touches, the easy manner in which information gathered from many sources is imparted in Benson's pages forms a merit that from the first commanded general praise.

Having suffered a further heavy bereavement in the loss of his wife, Benson in 1899 resigned the head-mastership of Rathmines School, and lived in a house on Montpelier Hill until 1902, when he was appointed rector of Balbriggan, and shifted his residence to Bedford House, in the outskirts of that town. Here the last sixteen years of his life were spent. In 1901 he had contracted a second happy marriage, and had also found time to bring out a second edition of "Our Irish Song-Birds." Perhaps the principal thing to be regretted about this second edition is that it was not delayed for a few years longer, since the author's translation to new surroundings, where his observations of bird-life were continued as unremittingly as ever, might have led to the introduction of some new and welcome matter. For instance, might not the Tree-Sparrow—the bird *par excellence* of Balbriggan—have claimed right of entrance within the charmed circle of our song-birds? Though not recognised as such in Benson's book as we have it, one would like to know how far, after a few year's residence in its neighbourhood, the author would have gone towards endorsing Howard Saunders' statement that "the male has a slight though somewhat pleasing song." Benson, at any rate, seems to have made the interesting discovery regarding this species that it disappears from the vicinity of Balbriggan in winter, and this observation is recorded by R. M. Barrington in the "British Association Handbook" for Dublin and Wicklow (1908).

He kept well in touch with the Dublin Naturalists' Field Club—conducting some of its excursions when ornithology was the object—and gave occasional "bird-talks" at meetings within his parish and elsewhere, taking a special interest in those of the "Irish Society for the Protection of Birds," by whom an address of his delivered in 1913 on the subject of "Swiss Birds" was afterwards issued in pamphlet form. Though he had now reached a ripe old age, his walking powers were still remarkable, and in default of trains he was known in the course of his seventy-seventh year to walk from Balbriggan into Dublin—a distance of 22 miles. His mental energy found scope in unwearying correspondence with those who shared his enthusiasm for one or more of his three great hobbies—"birds, boys, and boats." Among the many other subjects that attracted him, that of dreams held a distinct place, and a drawingroom lecture he delivered when visiting his friend and brother-naturalist Canon Flemyng on the "invisible visions to which we are awake in sleep" left lasting impressions on the memories of some at least of the audience.

His last Continental holiday (1914) was interrupted by the outbreak of the war, which found him in Switzerland; and it was no lack of activity on his own part that restricted his range during the four summers that remained to him. He took his share in the toils, as he did in the anxieties, of those years; but his thirst for fresh knowledge of nature never flagged. To the last, his letters and conversation were full of energy, and his interest in all that concerned the welfare of his friends was an irrepressible feature in both. That this sympathy extended to the feathered friends whose ranks had been so sadly thinned by the winter of 1916-17—and perhaps by other causes not yet explained—is only what all who knew him would expect; and it is not uncharacteristic that in his last published note (*Irish Naturalist*, vol. xxvii., p. 173) he expresses his fear that the aeroplanes constantly circling about Balbriggan have brought a new terror into their lives.

This is not the place to speak of him otherwise than as the student and lover of nature; but it would be hard to

find a fuller embodiment than Charles William Benson of the spirit so nobly expressed in Wordsworth's Ode—

Thanks to the human heart by which we live,
Thanks to its tenderness, its joys and fears,
To me the meanest flower that blows can give
Thoughts that do often lie too deep for tears.

C. B. MOFFAT.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include "Flemish Giant" and Dutch Rabbits from Mr. T. H. Greeve, a Goldfinch-Bullfinch hybrid from Mr. R. Carley, a Golden Eagle from Messrs. Williams, a Bewick's Swan from Mrs. Wallace, a Roseate Cockatoo from Captain C. Blake Whelan, Ring-necked Parrakeets from Mrs. Newman and Mrs. G. Peacocke, a Blue and Yellow Macaw from Mr. W. Sinnott Glenn, a Grey Parrot from the Hon. Lady McCalmont, and a young Crocodile from Dr. Mooney. A pair of Lion Cubs (parents "Red Hugh" and "Maive") and a Bison Calf have been born in the Gardens. A number of young Rhesus Monkeys and a pair of Pandas have been purchased. The Pandas are on view in one of the ape compartments of the monkey house; specimens of these interesting North Indian carnivores (*Aelurus fulgens*) have not been seen in Dublin for many years. Allied to the bears and racoons they are very tame and show themselves to be clever climbers.

BELFAST NATURALISTS' FIELD CLUB.

MARCH 18.—The President (A. McI. CLELAND) in the chair. D. LOWRY lectured on "Mexican Pyramids and Architecture." A. S. Bennett and R. May took part in the discussion which followed.

APRIL 15.—Annual Meeting.—The President in the chair. The Committee's report was read by Dr. Charlesworth. The Treasurer's, Librarian's, and reports of the sections were also submitted. These showed that although the Club had had many difficulties to contend with during the past year the Treasurer had a balance in hand and the membership of the Club showed an increase. In connection with the election of office-bearers four new members of Committee were added. Suggestions from members as to places to be visited on the summer excursions were then made, and referred to the Committee for consideration.

DUBLIN MICROSCOPICAL CLUB.

APRIL 9.—The President (W. F. GUNN) in the chair.

D. MCARDLE exhibited *Lejeunea minutissima*, Smith, bearing perianths and the androecium. The plant is very minute, scarcely visible when growing to the naked eye, of a white-green colour. The stem is filiform, geniculate, furnished with alternate leaves in which there is very little difference between the antical and postical lobes and which look more like a series of inflated bladders than leaves. It is remarkable that the row of under-leaves or stipules is absent, which at once separates the plant from some of its near allies which have these peculiar structures. The perianth is a delicate structure, emersed, pyriform, furnished with a series of pellucid cells. The androecium is on a short lateral branch bearing three or four pairs of cymbiform bracts, each enclosing a single large oval antheridium. The remains of Infusoria were shown in the inflated leaves, which also often contain Nostoc, etc., attracted by the moisture contained in the bladder-like leaves. The specimens were collected in a wood at Anascaul, Co. Kerry. The plant is frequent in the south-west, rare in the north and east of Ireland, and found also in England and on the Continent.

MAY 14.—The President (W. F. GUNN) in the chair.

DR. G. H PETHYBRIDGE exhibited the fungus *Papulaspora sepedonioides* found on a decaying onion bulb from a garden in the suburbs of Dublin. The systematic position of this fungus is doubtful, for whereas in Engler-Prantl's "Pflanzenfamilien" Lindau places it amongst the Hyphomycetes (Mucedinaceae), Schröter includes it in the Hemiascineae. It appears to be a saprophyte but its morphology and behaviour in culture have not been studied closely nor have infection trials been carried out. The fungus is of interest because its fructifications, at first glance, might be mistaken for the spore balls of Onion Smut (*Urocystis cepulae*) a serious fungoid disease prevalent in some parts of the United States of America which has, in the last couple of years, been found in isolated instances in England; happily it has not yet made its appearance in Ireland. Specimens of *U. cepulae* and of *U. colchici* from foreign sources were exhibited for purposes of comparison.

NOTES.

BOTANY.

Clavaria argillacea.

A white Clavaria, almost unbranched, which in very cold October weather was conspicuous last autumn on bare peat on Blackstairs, Co. Carlow, at 2,000 feet, was identified by Mr. A. D. Cotton as *S. argillacea* Fr. The only other Irish record appears to be from the Cork district.

R. LLOYD PRAEGER.

Dublin.

Some Stray Botanical Notes.

During the past few years the following plants have been noted either in new localities or their continuance in known stations ascertained :— *Raphanus maritimus.*—Strand near Greenore, Co. Louth, 1916. *Spergularia rubra.*—Still about the railway track near Schull, West Cork, 1917. *Chaerophyllum temulum.*—In fair quantity in a road-side hedge, about a mile south of Killarney ; probably introduced. New to Division 2 of Irish Topog. Bot., and to District I. of Cyb. Hib. *Sambucus Ebulus.*—About Goleen, West Cork, 1917 ; noticed there by Mr. R. A. Phillips in 1898. Near Tramore, Co. Waterford, 1918. *Matricaria discoidea.*—Rather sparingly about Greenore, 1916. *Orobanche rubra.*—Sparingly on a road-side bank near Cummins' Tower, Crosshaven, Mid Cork, 1916, growing on Thymus. New to Division 4 of Irish Topog. Bot. *Pinguicula vulgaris* var. *bicolor* Nordstedt.—Plentiful on the east shore and islands of Lough Derg about Dromineer, North Tipperary, 1913. This well marked plant was the only form of *P. vulgaris* seen in this neighbourhood. It does not appear to have been previously recorded from Ireland. *Atriplex portulacoides.*—Between Greenore and Carlingford, Co. Louth, 1916. *Sisyrinchium angustifolium.*—Sparingly by roadside near Schull Workhouse, 1917 ; seen in this neighbourhood by Mrs. Swan in 1898. *Typha angustifolia.*—In a small pool by the railway about three miles S.W. of Greenore, Co. Louth, 1916. Appears to be new to Division 31 of Irish Topog. Bot., and to District V. of Cyb. Hib. *Asparagus officinalis* and *Brachypodium pinnatum*, recorded by Mr. R. A. Phillips in 1899 from the Tramore sandhills were seen in his station in 1918, both plants looking quite native. These sandhills are the only Irish locality known for the latter plant.

REGINALD W. SCULLY.

Dundrum, Co. Dublin.

ZOOLOGY.

Athous hirtus Herbst, a correction.

In the February number of this year (p. 23 *supra*) I stated that *Athous hirtus* Herbst. was an addition to the Irish List. This was a very stupid mistake on my part, and I have to thank my friend, Mr. Horace Donisthorpe, F.E.S., for calling my attention to it.

In *Ent. Mo. Mag.*, vol. xlv., 1909, p. 53, Mr. G. A. Newbery points out that *A. niger* L. of the British Lists is not the true *A. niger* L. but *A. hirtus* Hubst., the main point of difference being the shape of the prosternal projection which lies between the anterior corae. In *hirtus* it is straight and flat ; in *niger* it is curved downwards between the anterior conae. Mr. Newbery thinks *A. niger* may be found here, but so far I have seen no record of its occurrence.

W. F. JOHNSON.

Poyntzpass.

William Spotswood Green, C.B., M.A.

To face page 81.

WILLIAM SPOTSWOOD GREEN,

C.B., M.A.

One of the most remarkable figures in the ranks of Irish science and one of its most stimulating personalities has lately passed away. The death of the Rev. W. S. Green, on April 22nd, is a great loss to Ireland and to his many friends. He was one of those gifted men who succeeded in making the meaning of science and research understood by the uneducated, and he was no less well-known in his native country by his unusual versatility and charm of manner.

He was born at Youghal in the county of Cork, on September 10th, 1847. After preliminary education he passed to Trinity College, Dublin, where he graduated B.A. in 1871, and M.A. in 1874. By profession a clergyman,

The Editors and Publishers of the *Irish Naturalist* much regret the delay in the issue of this number, owing to a dispute in the Dublin Printing Trade. It is hoped that the September number may be ready in a fortnight.

But his vocation was altogether too monotonous for him. His restless nature longed for the boundless ocean and extensive travels. Whenever he could get away he readily took the opportunity of visiting foreign countries. It was in Norway and Switzerland that he acquired the taste for mountain climbing. He longed to visit some unexplored mountain region where he could test his skill and endurance. And at last he found what was in his mind, a combination of ocean travel and adventure, namely, New Zealand. Having ascertained that the famous Mount Cook had never been ascended by anyone, he determined to try his luck. He set out in November, 1881, accompanied by two

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He was born at Youghal in the county of Cork, on September 10th, 1847. After preliminary education he passed to Trinity College, Dublin, where he graduated B.A. in 1871, and M.A. in 1874. By profession a clergyman, the sea, sea-faring and love of adventure and exploration exerted an extraordinary influence on his career. In his youth and even in his student days, the summer holidays were spent in sailing and fishing in Youghal Bay and in trawling on the south coast generally. By the time he was appointed Rector of Carrigaline (in 1878) in the county Cork he was an accomplished fisherman and knew all about the sea, including fish and fisheries. As he then lived close to the sea among fishermen he was thoroughly acquainted with their requirements and needs. He never failed them with his good advice and thus became a well-known figure among the craft on the south coast. But his vocation was altogether too monotonous for him. His restless nature longed for the boundless ocean and extensive travels. Whenever he could get away he readily took the opportunity of visiting foreign countries. It was in Norway and Switzerland that he acquired the taste for mountain climbing. He longed to visit some unexplored mountain region where he could test his skill and endurance. And at last he found what was in his mind, a combination of ocean travel and adventure, namely, New Zealand. Having ascertained that the famous Mount Cook had never been ascended by anyone, he determined to try his luck. He set out in November, 1881, accompanied by two

experienced Swiss guides, and after many hardships and innumerable difficulties they succeeded in reaching the summit of Mount Cook at a height of 12,349 feet above sea-level. The highest point hitherto reached was 7,500 feet, and the ascent of the mountain beyond that was considered quite impracticable. Mr. Green was thus the first to accomplish this wonderful feat, of which he communicated a vivid and fascinating account[1] to the Royal Irish Academy, and later on he published a popular work on this subject.[2]

From the rugged mountain heights he then returned to his old love the ocean; the depths of which he was fain to explore. At the instigation of the Secretary of the Royal Irish Academy a committee was appointed by that body in 1885 for the purpose of investigating the fauna of the hundred-fathom line. That was just the kind of job for Mr. Green, and in their first report the Committee state that they were fortunate in securing his services as leader of the expedition, as his enthusiasm in dredging operations was unbounded. His practical and topographical knowledge justified the committee in leaving him to make all local arrangements. A powerful tug-steamer—the "Lord Bandon"—was chartered for the expedition and she proved to be a very seaworthy vessel and in every way suitable for the work required. Many interesting species of deep-sea animals were obtained and recorded in the description of the results of the expedition.[3]

In the following year the Committee again chartered the "Lord Bandon" for a second cruise off the south-west. From a zoological point of view this expedition was a great success for many remarkable forms of animal life, including quantities of the white coral *Lophohelia prolifera*, were discovered. And all this work only whetted Mr. Green's appetite for more discovery and adventure, and it was not long before he was off again on another long voyage.

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[1] *Proc. R. Irish Academy* (2) vol. iii (Science), p. 642.

[2] "The High Alps of New Zealand," London, 1883.

[3] First report on the Marine Fauna of the South-west of Ireland. *Proc. R. Irish Acad.* (2) vol. iv. (Science), 1884-88.

In June, 1888, he sailed with his cousin the Rev. Henry Swanzy, for Canada, and crossing the Dominion they together explored the Rocky Mountains, and in particular that part of them known as the Selkirk Range and its mighty glaciers. One of the most important events during that expedition was the ascent of Mount Bonney, a difficult feat which he vividly described in a popular book.[1]

So successful were the cruises organized under the auspices of the Royal Irish Academy that the Council of the Royal Dublin Society felt that they ought to follow the example of the sister institution. A Fishery Committee was appointed by the Society in 1887, the object being to collect information about the sea fisheries in the south and south-west of Ireland and to suggest in what manner the fishing industry in Ireland could best be promoted. In this case also the duty of collecting and sifting the evidence was entrusted to W. S. Green. A preliminary report was published in 1887, and a second one in 1888. In the latter Mr. Green gives some valuable hints on fish supply and demand, on railway extension, on the brand-system and other problems.

The writer had the privilege of accompanying Mr. Green on one of these cruises. The pleasure of the trip was somewhat impaired by the instability of the trawler "Fingal," which had been hired for the occasion, but Mr. Green's even temper and his merry spirits under the most trying circumstances enabled one to bear all hardships with comparative equanimity. At the break of dawn one heard his voice singing lustily "up in the marnin' early" while engaged in overhauling the gear. Always genial and gay and ready to console his fellow-travellers at a time when the heavy ground swell which prevails on the south-west coast caused them to be mournful and despondent, Mr. Green was the life and soul of the ship, and after a few days one felt prepared to admire the marvellous contents of the trawl with a kind of grim pleasure.

Early in the following year Mr. Green was invited by the British Museum to undertake a trawling cruise off the south-west coast of Ireland merely to procure some of the much-prized deep sea specimens for that institution. The

[1] "Among the Selkirk Glaciers," London, 1890.

"Flying Fox" was chartered for this purpose, and being favoured by good weather he had a most successful trip. A sole which he discovered proved new to science and was named *Solea Greenii* after its discoverer.[1]

When an inspectorship of Irish Fisheries became vacant about this time the Chief Secretary had little doubt that the fittest man he could appoint to fill the vacancy was Mr. Green. And as Inspector of Irish Fisheries he proved a signal success and held the post for 25 years.

During the year 1890 the Royal Dublin Society continued the survey of the Irish fishing grounds in the south-west and although Mr. Green had now to give most of his time to his official duties he was always willing and anxious to help the Society's Fishery Committee. The "Fingal" was replaced in 1891 by the "Harlequin," and Mr. Green continued to devote a good deal of his spare time to the work of the Committee which was largely in the hands of Prof. Haddon[2] and Mr. Holt.

In the year 1892 Mr. Green was appointed a Commissioner of the Congested Districts Board, an honorary post. His profound knowledge of the people in particular the fishermen of the west coast, proved to be of great advantage to the Board. He held several other honorary appointments and it may be mentioned incidentally that he was a Member of the Royal Irish Academy, a Fellow of the Royal Geographical Society, and a member of the Alpine Club. He was one of the very few on whom the distinction of the honorary membership of the Royal Dublin Society was conferred. He was made a Companion of the Bath in 1907. He was an admirable and most fascinating lecturer who kept his audience spell-bound during his discourses which were generally on the Rocky Mountains, New Zealand, or the depths of the ocean.

R. F. SCHARFF.

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[1] Report of a deep-sea trawling cruise off the South-west Coast of Ireland. *Ann. and Mag. Nat. Hist.* (6) vol. iv., 1889.

[2] Survey of Fishing Grounds, West Coast of Ireland, 1890-91. *Scient. Proc. Royal Dublin Society* (n.s.) vol. vii., 1891-92.

THE WREN.

BY J. P. BURKITT.

THE Wren is a queer little bird, as the following will show. In the issue of the *Irish Naturalist* of November, 1918, I referred to the supposed cocks' nests of this bird, and to one proved case of such a nest, which was subsequently occupied. This year I made a study of some Wrens close round my own house.

Between the 13th and 17th April I found four Wrens building nests—all males, and apparently unpaired; and in a fifth case, a pair. The last was the earliest, and while the female was bringing moss to the *inside* of the nest, the male was carrying moss a certain distance and then discarding it, as if he might have been building, but his assistance had been disapproved by the female. I found another male building alone on the 10th May and another on the 21st May. I thus saw no nest this year, with whose construction I was acquainted, which was not built by the male. When I say built, I mean the main structure. The female always seems to do the feather lining, and her carrying of moss to the inside of the nest does not necessarily mean that she takes part in the original construction, as she sometimes requires moss to lessen the depth left by the male, &c. I am far from laying it down that the females never build nests, but certainly in this study I have never seen one. My only doubtful case was the earliest one above, which I shall call A, the other cases being B to G.

Males C and E built a *series* of nests, probably B also, as I shall show, and G. I could not follow up the others on this point. Wrens, like a number of other birds, have plainly each a definite domain to himself in the breeding season, the frontiers of which he does not cross. And inside these frontiers also the fledged young were fed and cared in the one case in which I watched this process. Inside this domain he may build this series of nests. The case which I could best give attention to was C, the bird's domain being to right and left of the front of my house. I will deal with the others first.

The nest of F was subsequently occupied. G has not been occupied, but apparently a brood has been reared in a later one of his series. E made at least two nests, but neither of these has been occupied. D, which had its main structure built on the 17th of April, was lined (implying a female) on the 9th May and had two eggs on the 13th May. B, which was built on the 17th April, showed a female on the 23rd, which began feather lining on the 26th, but had not its first egg till the 9th of May.

It thus seems pretty plain that the males may build their first nests, if not more, of a series (see C below) before having a mate. I admit that the female is a very elusive little lady, rarely giving you much chance of seeing her feathering the nest, and might be somewhere about all the time, but why should she delay so long in lining and laying ? (see also C).

My observations of C were more thorough. The male had a nest, C1, built in a low bush on the 17th April. On the 27th he had another, C2, nearly built in St. John's-wort at the opposite end of his domain from C1, and 100 yards from it. On the 3rd May he was building another, C3, in ivy about midway between the first two. On the 10th May I found him (?) lodged in C2 at 9.30 p.m. On the 11th he was singing hard a yard from C3 and flying in and out. On the 15th and 17th he was still working at the latter. A bird was lodged in it at 10.0 p.m. on the 18th. The 19th May was the first time I got a sight of an apparent mate with this male, and near C3. The next day, the 20th, there were some feathers in C3, and at 10.0 p.m. on the 21st the female (?) was in it and one egg. On the 22nd I found the male was well on with another nest, C4, near C1, in an exposed sapling under trees. The male when building his nests sings much, and seems to make unnecessary alarms, and it was this alarm which shewed him to me as back again, going in and out of C2 on the 27th. In the 28th I saw him at C4. On the 30th and 31st he was at C2 alarming and singing, and staying inside for ten or fifteen minutes ; and for a week later his singing and interest seemed to be at this end of his domain, separated from his sitting mate by my house and a wide open space.

I may note here that I cannot find that any male helps to feed the brood as long as they are in the nest, or takes any interest whatever at that time. In four cases I have kept the feeding female out of the nest for a lengthened time, making her sound much alarm, without producing any sign whatever of the male. But in the only case C in which I watched the brood *after* being fledged, the male certainly did take a very distinct interest; whether it was more in the young or in the female I cannot say. I am not clear whether he then took part in the feeding.

On the evening of the day the young left the nest I found one of them perched in the entrance of C4, and observed curious excitement of both parents around this nest, which was explained two nights later by finding the four young lodged in it, the night being cold but dry. They had also been about C2, but I cannot say whether they lodged in it, or how often they lodged in C4. I did not like to interfere with the nests too much. C4 was a very suitable nest for lodgings as it was specially deep owing to its situation in a fork, but it was exposed to view beside a path.

The feeding of the young continued for at least a fortnight after they were fledged—till 13th July. I was thinking the female might start a second brood in C2 or C4, but I suppose the 13th July would be rather late to recommence. All singing of Wrens stopped about the 18th July.

On July 6th, while fledged young were still being fed, the male (?) was visiting C2, and on the 11th I noticed this nest had been filled with moss to the entrance. The old breeding nest C3 I then found had its entrance also closed, but it was not filled up inside. C4 was not closed. C1 had been damaged for a considerable time and therefore did not play any part.

In Case B, the female had two eggs in a second nest B2 on the 27th June, fifteen days after the young left B1. B2 was 30 yards from B1. I take it that this male had also been the builder of B2 as the female would not appear to have had time after tending the first brood, and I would likely have seen any such late building; moreover the nest

was close to the male's favourite singing perch. She was carrying feathers to it after two eggs had been laid. Perhaps she began laying before lining.

From several experiences I find the Wren, like many other birds, sits on the eggs at night during laying, even beginning the practice of sitting before any are laid. (See note by S. H. Owen in *British Birds*, June, 1919, p. 23, naming some of the species which do this, and a note in July issue, p. 64, suggesting that the staler the egg the more incubation is needed). If that is the Wren's object, she seems to make a bad shot at it, as in four out of five of the first broods I found an egg left behind in the nest.

I think this is a common experience with the Wren, and compares with the case of male White-throats' nests (see *I. Nat.*, Nov., 1918), and I suggest the infertile egg is due to the female having a ready-made nest immediately on meeting the male. The four C nests were similar in having the exterior all dead leaves.

As regards the closing of the nests, I think I have in the past noticed old Wrens' nests with the entrance hidden. The closing of the old breeding nest does not seem to have much sense in it, only a moss-carrying craving, or it may compare with the practice of pulling a growing leaf over the entrance of a brood nest—as a concealment.

Notable points about the Wren therefore seem to be :—

1. The males making most or all (?) the nests, and each male making a series. I am not sure that he does not carry on several at the same time.
2. The delay in females appearing—needing explanation.
3. The male keeping in touch with all the nests and lodging in them both before and after a mate appears.
4. The covering of the eggs at night.
5. The unhatched egg.
6. The male's apparent disregard of the family till out of the nest.
7. The young roosting in the nests.
8. The closing of some nests.

Of course in order to delimit the domains of these birds and to be certain the same male belonged to a series of nests, and that a bird at any observation was a male (*i.e.* sings) a large amount of trouble was required. It was not guess work.

Many readers of the *Irish Naturalist* must have had experiences which would apply to these notes one way or another. Perhaps they will think it worth while to give them if the editors permit.

Enniskillen.

ERIOPHORUM LATIFOLIUM IN COUNTY DUBLIN, WITH SOME NOTES ON THE RARER COUNTY SPECIES.

BY REGINALD W. SCULLY.

IN the following list the numerals preceding the localities refer to the Districts as defined by Mr. Colgan in his Flora of the County; a cross (+) is added when the plant is believed to be new to the District.

Sisymbrium Sophia.—+8. One plant by roadside half a mile south of Ballybrack village, 1918.

Lepidium Draba.—+8. Six or seven plants by roadside south of Stepaside, 1918.

Viola lutea.—7. Still in two or three spots near the summit of the old Mount Seskin Road, 1919.

Trigonella ornithopodioides.—8. A patch of about ten good plants on Dalkey Island, one of them being a foot in diameter with over 50 shoots, an aldermanic specimen, 1919; J. P. Brunker. Not seen in this district for over 80 years.

Trifolium medium.—+6. One big patch on right of roadside about a mile west of Jobstown, 1918.—8. Sparingly by roadside near Foxrock railway station, 1912.

Chaerophyllum temulum.—8. In fair quantity by a hedge on the Old Connaught-Crinken Road, 1918. This is probably Mr. Barrington's Old Connaught station of 1868.

Galium uliginosum.—+7. Sparingly on damp slopes on the east side of the upper reservoir, Glenasmole, 1919; J. P. Brunker and R. W. S. This appears to be one of the rarest plants in the county.

Scabiosa arvensis.—Ascends to fully 1,000 feet near the Ballyedmonduff Road.

Petasites fragrans.—+6. Sparingly near Saggart and Newcastle, 1918. It ascends to 1,000 feet near the Ballyedmonduff Road.

Senecio squalidus.—+5. Several plants on old wall at Watson's Nurseries, Clontarf, 1913.

Silybum Marianum.—7. One fine plant near the Tallaght Road at Templeogue, and—8. a plant by the Ballycorus Road half a mile south of Kiltiernan, 1918.

Cichorium Intybus.—+6. About 20 plants in a field by the Naas Road opposite Corkagh demesne, 1918.

Linaria purpurea.—7. On walls by the River Dodder at Milltown, and —+8. on walls south of Dundrum, 1905-19.

Veronica montana.—+7. Damp roadside south of Jobstown, 1919.

Chenopodium rubrum.—6. Roadside between Tallaght and Saggart, 1918.

Epipactis latifolia.—8. Sparingly in damp ground at Rockfield, Dundrum, and in a roadside ditch south of Kiltiernan, 1912-18.

Orchis incarnata.—+7. Sparingly in Glenasmole, 1919; J. P. Brunker and R. W. S.

Allium vineale.—8. Abundant in the grounds at Rockfield, Dundrum, 1905-19.

Alisma ranunculoides.—8. Sparingly about pools on the Foxrock Links, 1918.

Eriophorum latifolium.—+7. In two or three spots on the damp slopes of Glenasmole on the east side of the upper reservoir, in fair quantity, 1919; J. P. Brunker and R. W. S. This graceful Cotton-grass does not appear to have been previously recorded for the county.

Carex muricata.—8. Plentiful over a limited area on a stony bank by the roadside about half a mile south of Sandyford, and a large tuft by the Old Connaught-Scalp Road near the county boundary. This plant has not been seen in the county apparently for many years.

C. divulsa.—+7. Roadside east of Tallaght, 1918.

C. aquatilis.—7. Another large patch of this rare sedge is now established on the shore of the lower Glenasmole Reservoir, a little north of the original clump, 1919.

C. pallescens.—7. Still sparingly in Glenasmole, 1919; J. P. Brunker and R. W. S.; one of the rarest sedges in the county,

Poa nemoralis.—8. In several spots about Rockfield, Dundrum, 1906-19, and by the sea road near Shankill, 1918.

Festuca Myuros.—+6. About the tram track near Embankment Station 1918.

Aspidium aculeatum.—+7. Shady bank on the old Mount Seskin Road, about a mile from Jobstown, 1919; J. P. Brunker and R. W. S. Apparently a very rare fern in the county.

Dundrum, Co. Dublin.

NOTES,

ZOOLOGY.

Ploiaria culiciformis in Co. Armagh.

On May 27th I was sitting at my study window which was open, the day was fine and warm, when a little insect flew in and alighted on a book I had open for reference. At first sight I thought it was a gnat but as its wings appeared to be rather dark I applied a low power lens to it and then saw it was a hemipteron or Plant Bug. I was greatly struck with the curious way it held its front legs, for instead of having them on the same plane as the rest, it held them up in front, reminding me of the attitude of the Praying Mantis. I sent it to Mr. J. N. Halbert who very kindly informed me that it was *Ploiaria culiciformis*, De Geer. I have asked him to supplement this brief note.

Poyntzpass. W. F. Johnson.

It is fortunate the little gnat-like visitor was secured by Mr. Johnson for it is certainly the above-mentioned insect which has not been recorded from Ireland nor do I know of any Irish specimens in collections. There are only two British species of the genus Ploiaria, *i.e.*, *P. vagabunda* and *P. culiciformis*, the latter insect is the smaller of the two with shorter legs and antennae and there are other differences. The commoner species, *P. vagabunda*, was recorded from Ireland many years ago by Dr. Power (*Entomologist*, vol. xi., p. 8). He probably found it somewhere in the neighbourhood of Waterford, though as his south of Ireland list refers to an area ranging from Thomastown in Co. Kilkenny to Tramore on the Waterford coast, there is doubt as to the exact locality. *P. culiciformis* has been recorded from a few places in England, chiefly in the southern counties, and it occurs as far north at least as Yorkshire. Curiously enough the insect appears to have a liking for the thatch of old cottages, and owing to the small size and peculiar form it would be difficult to find in such a habitat.

National Museum, Dublin. J. N. Halbert.

Carabus clathratus in Co. Clare.

During the second week of August I found, at Kilkee, Co. Clare, a specimen of this large ground beetle, which Mr. J. N. Halbert thinks a new record for the county. I found the insect under a stone in a dried water-course; it was unfortunately dead when I saw it.

Ascot Terrace, Limerick. Ernest H. Bennis.

Leucophasia sinapis in Co. Cork.

I took a few specimens of the Wood White (*Leucophasia sinapis*) in some marshy ground bordered by trees near Mallow, not far from the Railway Station, on the afternoon of May 30th whilst waiting for the train to bring me on to Killarney. I believe this butterfly is not only new to Mallow but has not been hitherto recorded from Co. Cork, though doubtless it will turn up in other parts of the county when looked for. That it should have so long escaped notice only proves, alas! the want of observers.

Holland Park Gardens, London, W. L. H. Bonaparte Wyse.

Leucophasia sinapis in Co. Wicklow.

On May 27th I took a fine male *L. sinapis* on a hedge dividing a lower spur of the Great Sugar-loaf Mountain from Kilmacanogue marsh. On May 28th I took another, also a male, along the hedge dividing Kilmacanogue marsh from the main road leading to the Glen of the Downs. The nearest wood—and one usually associates woods with this species—is The Quill about half a mile distant; this I have searched for further trace without result as yet. I can find no previous record of this rather local insect in the Dublin district.

Epsom. R. H. S. Tebb.

Pisidium parvulum in Co. Antrim.

On the occasion of the Belfast Naturalists' Field Club excursion to Moira and the Broadwater in May last, I dredged the canal for mollusca and was surprised upon working through my material at home to find that *Pisidium parvulum* was one of the commonest representatives of the genus. Since Mr. R. A. Phillips first recorded this little species as fossil from Ireland (*Irish Naturalist*, vol. xxv., 1916, p. 101) he has discovered it living only in the River Suck near Ballinasloe, Co. Galway. Having failed to find it in the Lough Neagh basin I had come to regard it as almost certainly absent from N.E. Ireland; its abundance in the deeper parts of the canal between Moira station and Aghalee is therefore rather curious. The molluscan fauna of the canal at this point, its head waters, is as follows:—*Limnæa stagnalis, L. auricularia* var. *acuta, L. pereger, Physa fontinalis, Planorbis carinatus, Pl. albus, Pl. glaber, Pl. fontanus, Valvata piscinalis, V. cristata, Bithynia tentaculata, Anodonta cygnea, Sphaerium corneum, Sph. lacustre, Pisidium subtruncatum, P. parvulum, P. nitidum, P. milium, P. amnicum, P. casertanum, P. henslowanum, P. pulchellum*, and *P. hibernicum*. I have listed the Pisidia in the order of frequency of occurrence in the dredgings. I have considerable doubt as to whether the species here referred to is the *Pisidium parvulum* of Clessin and Westerlund, as the only two sets of shells so named that I

have seen from the original locality in Sweden[1] have, upon examination, proved to comprise exceedingly small, though fully matured, specimens of *Pisidium hibernicum* and *P. nitidum*. This form of *P. hibernicum* much more nearly fits the original description than does the species now bearing the name *parvulum*; while the accompanying specimens of *P. nitidum* resemble a very small form of the variety which I have described as var. *crassa* (*Journal of Conchology*, vol. xv., 1918, p. 295). It seems possible therefore that when the matter is cleared up the name *parvulum* will have to be dropped.

Ballymagee, Bangor, Co. Down. A. W. Stelfox.

Pollan in Lough Ree.

On March 22nd of this year I found on the shore of Lough Ree a half-killed Pollan, presumably *Coregonus pollan*, commonly called the "Fresh water herring." The gulls had pecked her eyes out, a female fish about 1 lb. in weight. It is the only specimen I have seen from this lake, and the net fishermen I have spoken to say that they have never caught one.

The Bay, Athlone. J. ffolliott Darling.

Hoopoe in Innishowen.

On 28th April Mr. J. A. Johnston captured a Hoopoe (*Upupa epops* Linnaeus) whose wing had been slightly injured by a shot, near Carndonagh, Co. Donegal. It was in good plumage and he kept it until 2nd May, feeding it on bread and milk and supplying it with fresh sods. During his absence from home the bird escaped.

Templemore Park, Londonderry. D. C. Campbell.

Incubation of Birds.

In reply to Mrs. Rait Kerr (July, 1918), last year I watched a nest of Ringed Plover (*Aegialitis hiaticola*); the fourth egg was laid on May 26th and the young were all out on June 19th—24 days. This year with the same birds the fourth egg was laid on 21st April, and the young made their appearance on 14th May—24 days. All the egg chips are removed immediately.

The Bay, Athlone. J. ffolliott Darling.

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[1] One set is in the Westerlund collection in the National Museum in Dublin: the other in the "M'Andrew collection" kindly sent me for examination by Dr. Bryant Walker of Detroit, U.S.A.

Large Flock of Ring Doves in Spring.

During the end of March and early in April, 1919, I observed daily large numbers of Ring Doves collected in one particular grass field about a mile from Castlecomer. At first I estimated there were quite two hundred birds scattered over the field, but as time went on, especially after the first three or four days, the numbers rapidly decreased, and by the 8th April all had gone. The birds were comparatively tame and took little notice of persons passing on the road, which was much frequented, and ran along one side of the field from which it was separated by a low wall. At first I took them to be migrating birds, but as they remained in the same place, day after day, especially in the forenoon, I changed my opinion and came to the conclusion that they had assembled for the purpose of choosing mates. I noticed on several occasions what were evidently love antics being performed. A pair of birds would separate a little from the flock and gradually walk away from the main body, and one bird, presumably the cock, would droop his wings, fluff out his feathers and continually bow to the ground whilst following the other bird which was always a few feet in advance. The hen bird appeared to me to take little notice of these antics except that she continued to separate from the flock. On a few occasions, after about ten minutes, I have seen both birds fly away together, and if they did not do so they remained together, apart from the main body, and the cock would cease his antics though these might be resumed later. I have never seen a pair which had separated from the flock and indulged in these antics, rejoin the main body. I never could get near enough to the birds to hear if any note was uttered during this courtship. The species extremely numerous about this district. Perhaps some of your readers could say if it is the usual habit of Ring Doves to assemble in large flocks like this for the purpose of selecting mates.

W. M. Abbott.

Castlecomer, Co. Kilkenny.

Recent Records of Irish Birds.

Mr. Seton Gordon states that in 1918 at least seventeen pairs of the Common Scoter (*Oidemia n. nigra*) bred at the station discovered in 1905 by Major Trevelyan (*Field*, 10th August, 1918, p. 133). An adult male American Goshawk (*Accipiter gentilis atricapillus*) was shot near Strabane on 24th February, 1919; it showed no signs of having been in captivity (*British Birds*, 1919, p. 31). G. R. Humphreys records seeing three Dotterel at Kilbarrack, Co. Dublin, on 27th April, 1919, during the north-easterly blizzard of that date (*ibid.*, p. 61).

BOTANY.

Viola stagnina in Fermanagh.

Viola stagnina has been found by me all through the month of June in the townland of Fardrum near Drumcose Post Office, co. Fermanagh. It grows in great profusion round the edges of the little loughs in the limestone hollows, locally called the Green Loughs. This is a beautiful and interesting spot, almost the whole townland being covered with a native growth of Hazel, Birch, Thorn, and Mountain Ash, Spindle-tree and Guelder Rose.

W. B. Steele.

Mr. Steele is to be congratulated on a very interesting find. *V. stagnina* was for long known only from the area lying south-east and south of Galway Bay; its range was subsequently extended north-west to Clonbur, and north-east to Drumsna. The new station prolongs its range another fifty miles northwards. The first gatherings received from Mr. Steele contained *V. Riviniana*, *V. canina* and *V. stagnina*, and some puzzling forms apparently intermediate; but subsequent gatherings sent up were pure *V. stagnina*, fine and typical. The ground which it occupies in Fermanagh has figured frequently in botanical records under the name of Carrickreagh or Carragh Creagh—an area of limestone rock and scrub on the shore of Lower Lough Erne about seven miles north-west of Enniskillen.

R. Lloyd Praeger.

Dublin.

Plants of Co. Louth.

While on holidays in Co. Louth during June I found a small patch of *Lastrea Thelypteris* in a quaking bog on the south side of Ballabony Lough, about five miles N.W. of Ardee, near the Monaghan boundary, and quite a large station for *Habenaria albida* on the N.E. face of Carlingford Mt., about a mile and a half N.W. of Carlingford. Both these appear to be new to the county. Near the latter, in a deep gully, I found *Melica uniflora* in abundance; and I also saw *Osmunda regalis* common on Glack and Ardee Bogs, as well as at Brackenstown.

J. P. Brunker.

Rathgar, Dublin.

REVIEW.

BIRD STUDIES IN WAR.

Birds and the War. By HUGH S. GLADSTONE, M.A., F.R.S.E. London: Skeffington and Son, 1919. Pp. xviii. + 169. Price 5*s.* net.

Lovers of birds should feel grateful to Mr. Gladstone for this interesting account of the military activities of domestic birds and the response of wild species to the terrifyingly abnormal war-conditions of the western front. The work of homing pigeons for carrying messages was recognised as valuable during the years of war, and the opening section of the book gives some old and much new information on this subject. There is, for example, a story of a pigeon, sent from the scene of an action near Menin in October, 1917, to divisional headquarters. This bird was struck by a German bullet which broke a leg, denuding the shin-bone of flesh and driving the metal cylinder containing the message into the body. Nevertheless the pigeon completed its nine-mile journey and delivered its message the next morning, dying soon after its arrival. Equally useful were the canaries kept in the trenches, which gave warning of attacks by poison-gas, to the effects of which birds are far more sensitive than human beings.

The chapter on the behaviour of birds on the western front contains many facts of interest to the naturalist. During the summer of 1915 there were many species well represented in the battle-area, and "no-man's land" was tenanted by thousands of nesting pairs "in spite of the noise and all the dangers of artillery fire," and this abundance of bird-life seems to have continued till the armistice. The adaptability of breeding parents to noise is well illustrated by a story of a Blackbird which "built its nest in the body of a field-gun which had not been fired for four days, during which period the nest was made and three eggs were laid. Thereafter the gun was fired daily, but the bird laid two more eggs and continued to sit unconcernedly." The converse of this incident is afforded by the observation that "when in November, 1917, the bells of St. Paul's (London) rang out a merry peal for the 'victory of the tanks' the pigeons in a startled flock rose fluttering in the air, whereas in happier days when the ringing of the cathedral bells was a daily occurrence the birds used to regard it with indifference."

In his preface, the author expresses regret that he had not the opportunity of "sifting and elaborating" the notes which he has worked into the book. A critical enquirer might consider that some of the stories culled from daily newspapers rest on somewhat slender evidence. A daring speculation in which Mr. Gladstone indulges: "that birds bred within the battle area and reared amongst all the turmoil of war may have acquired an innate indifference to terrific noises which they may impart to their progeny," is calculated to afford a mild mental shock to students of inheritance. There are seventeen good photographic illustrations in the volume.

G. H. C.

RELATION OF SONG TO THE NESTING OF BIRDS.

BY J. P. BURKITT.

My discovery, if I may dignify it by that name (see *Irish Nat.*, November, 1918), that a huge number of Greater Whitethroat males may get no mates till the end of June, if at all, and that this explains the abundance and prolongation of their song, which would otherwise have practically ceased shortly after mating, led me to consider to what extent the same might apply to other songsters. In other words, in what species is the song an indication of a mateless male, and in case it is not, can any relation be established between the song and the connubial state, so that the song can be taken as an indication thereof? Such knowledge might possibly be a stepping-stone to interesting results. I thought there would be little trouble in getting information on this point from books, but so far I have got none. Mr. H. F. Witherby advised me to get Howard's "British Warblers: a History with Problems of their Lives." But as long as the price is £8, as quoted to me, I shall be unfortunately ignorant of its contents. It is not in the National Library, Dublin. Mr. Witherby also kindly referred me to two articles by Messrs Alexander in *British Birds* (vol. i., p. 367, and vol. iv., p. 224). I was able to procure the latter, and Mr. H. G. Alexander has kindly sent me a copy of the former. These articles give a summary of several years' observation of the song period of a large number of birds; that is, of the months in which they sing, and the effect of weather influences. These notes are most valuable and interesting. It is a pity they are not more readily available. Their subject is related to that of my question, but they give no direct information on it. The answer which I seek may in respect of many of the common songsters be well known to individuals, but not treated collectively anywhere. Schoolboys might turn some of their keenness on this instead of mere collecting. In very abundant species, it would need the selection of sufficiently isolated pairs.

I made this year a considerable effort to find for myself the answer in the case of Chiffchaff, Willow-Wren, and Sedge Warbler. I already have an approximate knowledge in

regard to Garden Warbler and Grasshopper Warbler, both of which practically give up singing when the mate begins to sit. The latter bird sings again in July previous to the second brood. And my experience goes to show that those Garden Warblers heard in full song after, say, the 25th May, are yet mateless, as further described by me in above article. In the case of the Grasshopper Warbler both parents feed the young; I cannot say about the others.

I had half a dozen Chiffchaff nests near my house, of which I had three under special observation—A, B, C, the first arrival being the 7th April; three had arrived by the 18th, and by then they had each settled down to a special site. Like many other birds, each has its own domain during the period of the first brood (I have seen one male chase his neighbour off), but late on in the season I could not be sure of the divisions being strictly adhered to. No mate appeared with any male till the 22nd April, exemplifying the known fact of the females coming later than the old males. Even on the 5th May many males in the county appeared to have no mates. A, B, C began building, began laying and hatched out, all on the same dates, namely, 23rd April, 4th May, 25th May. Upon the arrival of a mate and during the building of the nest I found A, B, C nearly silent and near the nest, but by the time the female commenced sitting the song was in full swing again. A new male (D) arrived on the 1st May—very noisy. On the 7th he became silent, and I found him also with a mate, and he sang very little for some time, thus agreeing with A, B, C. But during all the rest of the breeding period, on till se ond broods were started or after, I could not detect any distinct alteration in the song of any of these males, except for a few days slackening when the young first left the nest. Now it seems easy here to refer to the male of a certain nest, but in practice I found it far different. And this was an interesting point. In past years the fact of hearing many Chiffchaffs without being able to detect a female at hand, naturally led me to think they might be lonely males. I now find that the males' favourite singing area or perches may be far away from the nest, and may be seldom near it except in late evening and with a much lower song. For example,

in one case, instead of the male singing in the set of trees on the edge of which was the nest, and whence the young were fed, he spent the whole day in another set of trees separated by a wide open space, and his average position was 120 yards from the nest. Another male's almost constant site was a small plantation distant from the nest 70 yards along one hedge and 80 yards along another, total 150 yards as his course would go. A third male spent much or most of his time 150 yards from the nest. I proved this several times by keeping the feeding female out of the nest long enough for her to make sufficient noise to bring him from where he was singing far away. Even when the male was not singing, and therefore a better listener, it has taken up to a couple of minutes' hard alarm before he arrived. He takes no part at all in feeding the young when in the nest. When thus summoned he frequently blurts a bar of song into the alarm as if he found it hard to keep off the song, and on the female being let back to her nest, he moves off, and sings louder as he gets further away. That is my experience at any rate. All Chiffchaffs' song died away between the 12th and 19th July. I disregard the slight autumn singing. As to second broods, in the one or two cases I knew of, there was not anything like the song at the first broods. But the upshot of it all is that the song of the mated male goes on practically during the whole season. Nevertheless I still think that an odd one of the most persistent and strongest singers is unmated.

With the Willow-wren my luck was poor. But still I got something of value. Beginning to arrive on the 17th April, these birds could be heard everywhere on the 23rd. I saw no male with a mate till on the 3rd May, thus again showing the later female migration. Late males seemed to keep arriving up to the 21st May. A couple of such males were a week shifting about before settling on a final perch. I had six singing birds more or less under observation, but only three nests, and of these three only two from their commencement, and one of these two was later destroyed, so that my data in reference to actual broods is very weak. One of the earliest arrivals (B) had a mate beginning the nest on the 9th May, having an egg on the 17th. The male was singing

loudly and constantly till two days later, when the song became infrequent, dropping to a very low note from low perches. About the 1st June it re-started a strong and constant song, but I found the nest had been destroyed, and I think the female perished also, for I never saw her again. The male sang on constantly from high perches till the 29th June, when he suddenly stopped and only made a few low notes. I found him with an apparent mate. I heard a few more low notes for two days, but thereafter I never heard him again except early on the 29th July. (I am writing on 3rd August).

The other breeding male, C, seen first on the 30th April, got a mate about a week later and ceased all song before the 13th May. On that day I saw a feather being carried, but I could not find the nest, and from then till the 3rd June I visited the site at varying hours without ever hearing a note. Except for that one feather I could hardly believe the pair could be about. On the 3rd June the male sang at 8 p.m., and I found the young being fed, just hatched, in the spot I had expected. I never heard any more singing except a possible note or two for a couple of evenings. The female alone did the feeding. In the case of another brood which I found in a nest I had heard no singing for a long time though I passed the place daily.

Now as regards mateless males. A late male, E, was shifting about from 12th to 19th May. He then remained singing at a spot till the 27th May when an apparent mate appeared. I have never heard him since. A male, A, which was one of the earliest to arrive kept to a particular perch on a small tree from 17th April till the 8th July! Four times a day I passed this bird singing loud up till 10 p.m., at intervals of, say, 10 seconds and audible up to 250 yards away, only ceasing for occasional feeding. I could never detect any brood operations or any mate till 8th July when a companion appeared. On the next day singing entirely ceased, except a very rare few notes, up to the 15th and again early on the 29th. Another male, F, remained at a couple of perches about 50 yards apart from the 21st May till the 1st July and had no mate that I could detect, and sang like A. On the 1st July there was a companion and the male was singing low. I never heard him again.

There were a good many singers (query mateless) over the country on the 1st July, but none a week later. The indication (if of any value) from these Willow-wren observations would be that the males practically cease to sing very shortly after mating; and that, therefore, those males which continue in full song are mateless. The late companion of E and the very late ones of A, B, F, if they really were mates, correspond to what occurs to the Whitethroats (see my article referred to). But does anyone know of Willow-wren nests in July?

As to Sedge-warblers, and any deduction to be got from their singing, there is not much to say according to my observation. I had six or seven cases under observation, of which three included nests.

I selected fairly isolated cases. The result of my notes, which I need not detail, is that the Sedge-warbler sings more or less during the whole season. But I was surprised how little gratuitous song there was. Of course the male will at all times sing a little on disturbance. But the only considerable free singing was on arrival, before mates had been met or selected, and again about the 1st July, when they gravitated to form communities in the sedge areas or meadows or oats. About the middle of July they get again silent, though sometimes a song is heard till the end of the month. I cannot say that the July singing is because of second broods, as I did not notice isolated second-brooders singing. I think many of them have second broods. In 1918 I found a bird on three eggs (one chipped) as late as August 2nd, and plenty of young seem to be in the nest till that date. Both parents feed the young.

I might start a table as under :—

Whitethroat	Song ceases	Later songsters mateless.
Garden Warbler	Song ceases	Later songsters mateless ?
Willow-wren	Song ceases ?	Later songsters mateless. Male does not feed ?
Grasshopper Warbler	Song ceases	Male also feeds.
Chiffchaff	Song continues	Male does not feed.
Wren	Song continues	Male does not feed.
Sedge Warbler	Song indefinite	Male also feeds.

Enniskillen.

ALEXANDER MACHENRY.

Not only by his former colleagues of the Geological Survey and other officials of the old Science and Art Department, with whom he was so long associated, but also by numerous foreign geologists who from time to time visited this country to study some particular point of interest, will the death of Alex. MacHenry be learned of with much regret.

He was born at Ballycastle, Co. Antrim, in 1844. His parents while he was quite young, came to reside in Dublin, and MacHenry derived his early tuition at the Central Model School under the care of Dr. P. W. Joyce, the eminent Irish historian and antiquary, and it was thus his after-life tastes developed. At this period (late fifties) the institution then known as the Museum of Irish Industry,[1] under the directorate of Sir Robert Kane, was a source of much attraction to Dublin citizens, the evening lectures of such men as Sullivan, Barker, and Jukes were eagerly listened to by crowded audiences of the artisan and other classes, conveniently suited by the hours of their delivery. Beete-Jukes's lectures on geology were especially availed of, and his enthusiasm for his subject, splendid delivery and commanding presence at once enlisted the interest of his audience. Amongst others who subsequently attained reputations as ardent investigators of the geology of Ireland, whose interest was aroused by those lectures, was MacHenry. His early zeal on the subject attracted the attention of Jukes, who brought him to the notice of Sir Roderick Muchison, and the latter in 1861 appointed him Specimen Collector on the Irish Survey, in succession to James Flanagan, one of Portlock's old collectors.

Under the guidance and instruction of Wm. Hellier Baily, MacHenry quickly developed a keen interest in palaeontology, and one of his first essays at field-collecting was at Kiltorcan, Co. Kilkenny, and here he found a crustacean named after him. The Geological Survey Collection then located in the Museum of Irish Industry was a large and representative one, beautifully housed and kept ; it included a complete series of British fossils, as well as the duplicates of the famous Portlock collection, the original

[1] Now the Royal College of Science for Ireland.

set of which had been deposited in the Museum of Practical Geology, London, upon the break-up of Portlock's Survey many years previously. MacHenry devoted all his time which could be spared from field duties to the care of this collection, and kept it in fine order; one could wander round with a primer or handbook of geology and identify every rock or fossil!

In 1877 MacHenry was appointed Assistant Geologist, and the mapping of the wild district of north-west Mayo devolved upon him; his accurate description of the interesting series of granitic and metamorphic rocks can be studied in the Memoir to one-inch sheet 63, etc. Several working seasons he was occupied in endeavouring to trace boundaries in the Devonian series of Cork and Kerry; later on he joined Glascott Symes in working out the area about his native place, Ballycastle, and he was the first to suggest the shales there being oil-bearing, as well as the probability of the Coal-measures extending under the more recent formations south-westwards and joining in with the Tyrone coalfields, an opinion which recent experiments have so far failed to justify.

His earlier experience of the supposed similar rocks of N.W. Mayo marked him out to the Director, Prof. Hull, as "the man for Donegal," and at this area he was engaged until the completion of the geological map of Ireland in 1889. His mapping of the complex structure of that county has hitherto resisted all crotchet-seekers. In the too short period during which Prof. W. W. Watts was attached to the Irish service MacHenry and he traversed many districts together, investigating the gneissose and felsite rocks of the west of Ireland and unravelling many interesting problems in connection with them, as well as pointing out the occurrence of crush-breccias, hitherto unobserved.

In 1901, under the direction of Mr. G. W. Lamplugh, MacHenry carried out the survey of the drifts of Dublin City and much of the surrounding country, a work in which his local knowledge afforded him great advantage. During the following three years he pursued similar work in the areas of Belfast, Cork and Limerick, the maps and descriptive memoirs of which were all rapidly completed and published.

MacHenry was probably the last link with the distinguished geological circle which Dublin was so fortunate as to possess in the past century. He knew personally and discussed geology with Tait, Griffith, Oldham, Haughton, John Kelly, and others, whose names will always be associated with the palmy days of Irish geology, when a wide popular interest which, alas, is now almost extinct, was taken in its study. A reference to the earlier Journals of the Geological Society of Dublin will show the class of Dublin citizens and others who pursued the study of the subject. MacHenry's official relations with such men as Jukes, Hull, Du Noyer, Kinahan and Baily were of inestimable value to him, and he never omitted to express his indebtedness to them for much that he knew, and he was not above appreciating the memory and past experience of such of his colleagues as he might have occasion to consult. His extensive knowledge of all parts of Ireland constituted him a species of " enquire within " when foreign or other visitors required information, and he was almost invariably sought out as leader of geological trips through various portions of the country; in this respect attention may in particular be called to his sketch of the geology of County Antrim, compiled for the visit of the Geologists' Association in 1895, which affords a concise account of the geology of the district, and must prove of great interest and utility to those studying it. His genial, friendly disposition much enlivened expeditions fortunate enough to secure his presence, and his society at the dinner-table, where his qualities as a raconteur and narrator of former incidents of geological days braced up many a tired-out geologist and were only equalled by his discourses in the field. He accompanied Sir Archibald Geikie on his numerous inspections throughout Ireland, and in earlier years, when Professor T. H. Huxley described the Amphibia of the Leinster coalfields, MacHenry was of much assistance to him in his researches over the district.

Of a quiet, retiring disposition, MacHenry sought no publicity, and outside his official Survey writings and association with Kinahan in some of the latter's works left but too few records of what he knew of Irish geological history. His genial personality and helpful friendship will, however, always endear his memory to those with whom he came in contact.

R. CLARKE.

REVIEWS.

MARINE ZOOLOGY FOR THE YOUNG.

The Seashore; its Inhabitants and how to know them. By FORSTER ROBSON. London: Holden & Hardingham, Ltd. Pp. 112. Price, 1*s.* 6*d.* net.

In this little book the author seeks to interest children in the animals and plants of the seashore by describing briefly a selection of the commoner forms, some of which are represented by roughly-executed drawings. The author's structural and systematic statements are often open to serious objection; for example, the cuttles are treated as a group distinct from the mollusca, while the ship-barnacle is said to have a "long neck . . . attached to the wood by a sucker-like mouth."

USEFUL BIRDS.

Birds Beneficial to Agriculture. By F. W. FROHAWK. London, British Museum (Nat. Hist.). Economic Series No. 9. Pp. vi + 48. Price, 2*s.*

This pamphlet has been written to elucidate an exhibit of useful birds in the central hall of the Natural History Museum at South Kensington. The species are well-selected, the qualification now generally recognised as to the "beneficial" nature of such birds as the Rook and the Starling being frankly pointed out. There are twenty-two plates, admirably reproduced from drawings made by Mr. Frohawk. More use might have been profitably made of recent memoirs on this very important subject, and the absence of a bibliography impairs the usefulness of the attractive little book.

NOTES.

BOTANY.

Vaccinium Myrtillus on Raths.

The raths, even yet so often met with in various parts of Ireland, have received much attention from archaeologists. Their relation to the flora of the country, in one respect, is apparently not unworthy of investigation. On the raths I examined all over Co. Cork I have generally found the Whortleberry (*Vaccinium Myrtillus*) growing—sometimes in great profusion, sometimes on close inspection, a few attenuated specimens only will be found to survive. Very frequently the plant will be found nowhere else in the neighbourhood. I have occasionally found the site of a rath which had been levelled to the ground, marked by the growth of the Whortleberry. Of course it is well known that the plant is a *calcifuge* species, and therefore need not be looked for on limestone soil.

JAMES NOONAN.

Cork.

Potamogeton panormitanus in Ireland.

In a note in the *Journal of Botany* for October, 1919 (p. 285) Mr. Arthur Bennett writes: "I also find specimens of *P. panormitanus* Biv., from Ireland as "*P. pusillus* L., var. *tenuissimus* Koch., off Harbour Island, Lough Neagh, Co. Antrim, 10 Aug., 1909, C. H. Waddell. It is probably fairly distributed in this country but all specimens need examination as to whether they are this or *pusillus*."

Tolypella glomerata var. erythrocarpa.

This variety is described as new by J. Groves and G. R. Bullock-Webster in the *Journal of Botany* for August, 1919, from one locality in Anglesey, and two in Ireland—Lough Melvin in Leitrim (R. Ll. Praeger), and Lough Magheradrumman in E. Donegal (G. R. Bullock-Webster).

ZOOLOGY.

Leucophasia sinapis in Co. Wexford.

On May 30th I took a fresh-looking male of the Wood White butterfly in a wooded glen called Tubbergall, which forms part of the boundary between Ballyhyland and Caim. I believe this is the first recorded occurrence of the species in Co. Wexford. I am much interested on finding from Mr. Bonaparte-Wyse's and Mr. Tebb's notes in the July number (*supra*, p. 92) that the insect has also been added this season to the faunas of Co. Cork and Co. Wicklow, and not only so, but also very nearly on the same date in all three cases—Mr. Tebb taking his two specimens (both males) on May 27th and 28th, while Mr. Bonaparte-Wyse's first capture was made on the 30th and mine on the same day. I can hardly think it a mere coincidence that the same butterfly should have turned up for the first time in three different counties (all in the southern half of Ireland) in the course of the same week. Its not having been noted previously in Co. Cork is attributed by Mr. Bonaparte-Wyse solely to "want of observers," but I had been attending to the butterflies of the Ballyhyland district for more than forty years before I saw my first example of *Leucophasia sinapis*, in a piece of ground that had always been one of my favourite hunting resorts; and though it was so fresh a specimen that it is hard to imagine it had flown far. I find it equally hard to believe that a species so long looked for in vain had all the time been a resident only half a mile from this house. The simultaneous capture made in two other localities so far apart as Mallow and Kilmacanogue add much strength to the suspicion that a sudden irruption of this butterfly must have taken place.

C. B. Moffat.

Ballyhyland.

Wasps attacking Flies.

On September 9th, when in Brickett Wood, Hertfordshire, I noticed some wasps hovering over an aspen tree on which a number of flies were settled, and one of them swooped on to a fly and fell with it to the ground. This reminded me that I had intended to write a note on this subject for some time past. In the *Irish Naturalist*, vol. xxvi., p. 88, 1917, Dr. R. F. Scharff writes that he has never seen wasps attack flies. I personally have frequently done so. I have seen wasps on many occasions catch a "blue-bottle," deliberately cut off its head, saw off its wings. and then fly away with the body. I remember pointing this out to some people (who were not entomotogists) at Brockenhurst in 1901. They were very interested by the systematic way in which the wasp dismembered the fly before flying away with it. I have always been interested in wasps, and personally I do not kill them unless obliged to do so. It may also be worth repeating what I wrote in 1917 on the copulation of wasps :— "On September 23rd, about eleven o'clock in the morning, I observed a pair of wasps (*Vespa vulgaris*) *in cop.* at Putney. It was in a road near my house, and my attention was first drawn to them by one of my Pekinese, which was evidently interested in something on the pavement. The male was on the back of the female, and at times was dragged along on his back behind her. They were unable to fly properly, only fluttering a short distance, and walking. When at rest the male's body was seen to be in regular motion. I twice endeavoured to box them, and eventually they separated and flew off in different directions. It seems advisable to publish this observation, as I am unable to find any reference to the copulation of wasps in any books I have or have been able to consult." [*Ent. Rec.*, vol. xxix., pp. 231 (1917)].

HORACE DONISTHORPE.

Putney Hill, London, S.W.

Early Arrival of Redwings and Fieldfares.

On 26th August of this year I saw six Redwings at Hillsborough. The earliest date given for the arrival of this species in Ireland in Barrington's "Migration of Birds" is 20th September, 1892, at Rockabill Lighthouse. In the "Northern Whig" of 13th September, "T. McC." states that he saw a flock of Fieldfares at Dunadry, Co. Antrim, about the 7th September, and as he describes the call-notes of the birds he saw I have no doubt that his diagnosis of the species is correct. The earliest date given for Ireland is that in Thompson's "Nat. Hist. of Ireland," where it is stated that these birds were observed on 20th September. The B. O. C. "Migration Reports" cite numerous instances of this bird's arrival in Great Britain on and after 16th September, and Thompson states that Fieldfares were seen in Scotland early in September, 1838.

NEVIN H. FOSTER.

Hillsborough, Co. Down.

Black-tailed Godwits in Co. Mayo.

Early in September I shot, on the estuary of the River Moy, which flows by our island, a couple of Blacktailed Godwits. None of us have ever seen one here before, and my father, who has used a shooting-canoe for over fifty years and has often bagged large numbers of Godwits, never found one of the Black-tailed amongst them, while the late Mr. Robert Warren, a great friend of ours, only observed them on a few occasions.

MAUD KIRKWOOD.

Bartra Island, Co. Mayo.

OBITUARY.

REV. COSSLETT HERBERT WADDELL, B.D.

Death has been busy lately among the ranks of Irish naturalists, and our pages recently have recorded many losses. The decease last May of C. H. Waddell, still in the full vigour of manhood, causes a gap in Irish botany which no one can at present fill. Graduating in Trinity College, and ordained in 1880, his was the quiet life of the Irish country clergyman—first as curate at Lurgan and Warrenpoint, then as vicar of Saintfield (1890), and finally as rector of Greyabbey (1912), where he remained until his death. He early showed an interest in systematic botany, in which he was encouraged and aided by that most helpful and generous of North of Ireland workers, S. A. Stewart. He became expert both as regards the Flowering Plants and the Higher Cryptogams, and from 1893 onwards was an occasional contributor to the *Journal of Botany* and a frequent contributor to the *Irish Naturalist* from its foundation in 1892. He was especially interested in Mosses and in the critical genera of Flowering Plants, such as Brambles, Roses, Hawkweeds and Knotweeds, and contributed many specimens in these groups to the Watson Botanical Exchange Club. He was not a profuse writer, his contributions generally taking the form of short notes; and these were confined, so far as I am aware, to the two journals named. He maintained for forty years, since his election in 1879, a warm interest in the Belfast Naturalists' Field Club; he served long on the Committee, and occupied the Presidential chair in 1898-99 and 1899-1900; he made numerous contributions to its Proceedings, being especially active in lectures of instruction connected with the Club's Botanical Section.

Gifted with an enquiring mind and a critical eye, he obtained a thorough knowledge of the more obscure groups in the local flora, and it is to be regretted that he did not to a larger extent push his enquiries to the point of publication. A pleasant and helpful companion, his loss will be deeply felt by all who had the advantage of spending days in his company among the hills and vales of County Down.

R. LL. P.

FOSSIL SHELLS FROM WEXFORD AND MANXLAND.

BY ALFRED BELL.

WHEN presenting the Reports on the Manure Gravels of Co. Wexford to the British Association in 1887-1890, it appeared to the writer that the theory of their glacial origin was not well founded, nor borne out by their faunal contents, nor by the way in which these were distributed; and this opinion was confirmed later, when, visiting the country to the north of the Peel-Ramsey line in the Isle of Man, he saw that the same conditions prevailed there, not only in the stratigraphical arrangement, but equally so in the fossils yielded by the clays and sands exposed in this area. Subsequent researches have intensified this conviction. According to Mr. Hallissy,[1] the basal bed of this series is a highly calcareous chocolate-coloured clay or marl (laid down by the Irish Channel ice), which occurs over practically the whole district, succeeded by shelly gravel and finely stratified sand, the whole capped by a " stratum " of calcareous clay marl of a drab colour (Griffiths).

This order also prevails in the Isle of Man just referred to, where, according to Prof. Kendall[2], the lower bed of dun-coloured Boulder-clay contains a large quantity of small stones, frequently well glaciated, and a great abundance of shells in a fair state of preservation ; this agreeing with the contents of the Wexford marls. The Manx clays vary in texture from stony till to fine buttery clay.

At one place Prof. Kendall met with a bed of fine tough clay unlike any of the drift beds in the Irish Sea basin with which he was acquainted, containing a well-preserved boreal fauna, many of the bivalves having their valves still in apposition. In this particular clay were one or two seams of gravel which seemed to show signs of having been involved in the clay by some kneading or shearing movement subsequent to its formation. A very similar arrangement is present in the Holderness clays on the Yorkshire coast.[3]

[1] Hallissy, T. : On the superficial deposits of the County of Wexford. *Irish Naturalist,* Vol. xxi., p. 175, 1912.

[2] Kendall, P. F., *Yn Lioar Manninagh,* vol. i., p. 398, 1894.

[3] Bell, A., *Naturalist* (Yorkshire), 1918.

One of these seams, Professor Kendall states, contained many shells, mostly species of Trophon, such as *T. scalariforme* and its kindred, and this genus is very prolific both specifically and individually in the Wexford gravels, especially in the Blackwater cliffs on the coast.

The bed of sand overlying this clayey gravel is " certainly suggestive of regular and horizontal stratification " (Kendall, *loc. cit.*). Further northwards the cliffs rise near Cranstal Point to 270 feet.

The fine sands seen in these cliffs are of the same texture and like those in the valley of the Slaney river, Wexford, contain a few large boulders. One of these recorded in my Wexford Report[1] had evidently fallen from above as if dropped from a passing ice-floe, as it had disturbed and compressed the laminated sands into which it had fallen. As at Pulregan, Wexford, the foot of Cranstal cliffs yield a harvest of shells weathered out from above.

It was further noticed upon comparing the fossils from the two districts, *i.e.*, Wexford and the Isle of Man, that both contained many species and generic types in common not found elsewhere in the Irish Sea area, including a number of forms either extinct or new to science, and many species still living in either Southern or Northern Europe, but not in the present Irish Sea basin. The Wexford gravels, etc., have yielded up to the present about 200 species ; those of the Isle of Man, 145 species. Of the shells common to both localities, there are either extinct or new to science, 11 ; Southern Europe, 2 ; Northern Europe, 19 ; and Celtic, 59 species.

The combined faunas of the two areas make up a total of more than 260 species, which may be grouped as follows :—

		Ireland.	Isle of Man.
Extinct or new to science	53	26	41
Southern Europe ..	27	22	5
Northern Europe ..	63	55	24
Celtic (British) ..	119	103	75
	262	206	145

[1] *Report, British Association, op. cit.*, 1888.

Many of the extinct forms are of Pliocene origin, and Prof. Cole has noted the occurrence of iron-stained shells in the drifts of Co. Carlow, and cites them as fair evidence of the existence of Pliocene deposits in Ireland.[1]

The condition or preservation of the shells is to some extent governed by the nature of the matrix they occur in. Where they are found in clay they may be presumed, especially those bivalves that have the valves united, to be *in situ*, while those from the gravel show signs of transport and rough treatment, but not to any great extent. Most of the bivalves are broken into angular fragments, often of large size, with a clean and sharp fracture. The larger Gasteropods have usually lost their apices, the Neptuneae and the Buccina much of their outer surface by exfoliation. These occur from just hatched individuals to others of great age. The Purpuras have suffered from the attacks of a boring sponge, which in some cases has nearly eaten them away.

The carnivorous mollusca abound especially in Ireland, occurring in hundreds where the ordinary phytophagous species may be counted by individuals, the only exception being the ordinary *Turritella communis*, which is a very common shell. It is singular that so few remains besides shells occur in these deposits—as except many valves of Balanus, a careful examination of hundreds of shells and fragments produced only a few Polyzoa, Serpulae, and others, barely a dozen examples in all.

In working out the fossils from Wexford, I have to acknowledge with many thanks the assistance rendered me by the Most Rev. William Codd, D.D., Lord Bishop of Ferns, and by the Rev. G. N. Harrison, M.A., of Ramsey, for the gift and loans of specimens from the Blackwater cliffs (Wexford) and the Cranstal or Shellag sands in the Isle of Man.

Comparing the faunas of these widely separated areas, with those of all the other Pleistocene marine deposits in the Irish Sea basin, older than the Estuarine Clays, including beds of various ages and origins, clay, gravels and sands from

[1] *Proc. Roy. Irish Acad.*, Vol. xxx. (B), 1912, p. 11.

Derry and the Point of Ayre southwards, and from West Ireland to the midland English counties, and at all heights from the shore at Ballybrack to the Wicklow Mountains on one side of the Irish Sea, and Moel Tryfaen, Gloppa and other elevated sites of 1,200 or 1,400 feet on the other, it will be seen at once that we are dealing with a very different type of faunal life.

The recorded species from all the above deposits number about 130, of which several are northern forms, including four or five *not* met with in the Wexford-Manx areas, *Cardium islandicum*, *Serxipes* (*Cardium*) *groenlandicus*, *Rhynchonella psittacea*, *Turritella polaris*, and *Buccinum groenlandicum*. The southern species include *Pecten glaber* (Ballybrack), and twenty-five others not met with before either in Wexford or in the Isle of Man.

Chiton marmoreus.
Bittium reticulatum.
Dentalium tarentinum.
Nassa pygmaea.
Rissoa membranacea.
Rissoa parva.
Trochus cinerarius.
Trochus magus.
Cardium aculeatum.
Cardium exiguum.
[1]*Diplondonta rotundata.*
Lucina borealis.
Lucina divaricata.
Isocardia cor (Balbriggan).
[1]*Lucinopsis undata.*
[1]*Mactra glauca.*
Modiolaria marmorata.
Psammobia vespertina.
Pholas candida.
Pholas parva.
Syndosmya alba.
Scrobicularia plana.
Tellina tenuis.
Tapes decussatus.
Venus gallina.

Deducting the few exotic species mentioned above, the fauna is a representative modern group of southern tendencies, entirely different from that of the Wexford-Manx deposits.

The causation of the latter group is still a matter of question. If morainic, as photographs of the Blackwater cliffs suggest, the question arises from whence did the contained Pliocene fauna come, as there are no Pliocene deposits known so far north till we come to Iceland, and these are not Icelandic species, neither are there any traces of them in the present Irish Sea floor.

[1] Only recorded from Worsden, in Lancashire.

If "concentrated" from the chocolate-coloured clay, this should contain a similar group of forms, which it does not, or if it does, the evidence has never yet been published, and the Pliocene species are referred by Messrs. Cole and Hallissy to the gravels.

The Blackwater cliffs extend nearly continuously for twelve miles along the coast, with a thickness of 70 feet, rising at the Head to 160 feet, made up of marls, sands and gravels alternately disposed, with many small shell-fragments in the latter (Kinahan). Calcreted sands abound here and in the Isle of Man. Their age being problematical and their origin equally so, I may be excused the suggestion that they are the relics of an early Irish sea or inlet which originally started in early Pliocene times from North Cornwall, and lasted till the tectonic changes, of which we get such abundant evidence in Eastern England, permitted the influx of northern waters, northern shells, and floating ice-floes with their rock debris. Northern shells began to arrive in England in the Upper or Boytonian stage of the Coralline Crag, but the Northern Tellen (*T. balthica*) did not appear till the very latest stage of the Norfolk Icenian at Weybourn, and the presence of this shell in the Wexford-Manx sea would imply that it was at this stage the northern barrier was broken down in this direction.

I would suggest further that the shelly gravels at Blackwater and other Wexford localities (and their sporadic occurrence is in favour of this conclusion) are current-swept sandbanks such as are recorded by Wyville Thomson off the Portuguese coast[1] where one haul of the dredge brought up 113 species of shells alone. Of these 40 per cent. were new to science, numerous Sicilian Tertiary forms and others of northern types, besides many living Lusitanian species.

The Turbot Bank, off the coast of Antrim, may be referred to as another example of shelly sands and gravels. From here and the immediate neighbourhood 246 species of shells have been procured, mostly dead. It is doubtful if any of these are *in situ*, certainly not such forms as *Acirsa borealis, Natica affinis, Trochus cinerarius, Trophon clathratus, Astyris rosacea, Buccinum cyaneum,* or *Molleria*

[1] "The Depths of the Sea," p. 183. 1879.

costulata. For other examples of current-borne species see the Report, British Association, Leeds, 1890, page 415.

It is probably due to current action that so many shells of southern origin have found their way into the deeps off S.W. Ireland, where *Cassidaria rugosa*, *Ranella gigantea*, and even *Pedicularia sicula* are found living with others of purely northern type like *Volumitra groenlandica*.

The term "boulder-clay" as commonly used is not always appropriate, and I agree with Dr. Crosskey that it should be confined to the inorganic "till" of land-ice origin, and not to the often fossiliferous clays of marine origin, whatever stones they may contain.

The substance called "boulder-clay" in maritime districts is chiefly the sediment of the turbid streams pouring from the ice-front or face, or water-sorted material carried by floating ice. The late R. Brown[1] noticed that such a stream deposited a layer averaging three inches per annum over a sea-bottom full of marine organisms and various stones, and remarks that such a deposit was indistinguishable from the usual so-called "boulder-clay."

A very representative series of the Wexford shells has been forwarded to the National Museum, Dublin, and nearly 100 examples of the Wexford-Manx mollusca have been already figured by Mr. F. W. Harmer, M.A., F.G.S. in his "Monograph of the Pliocene Mollusca" (Palæontographical Society) of which the first volume has now been completed.

Cringleford, Norwich

[1] Brown, R.: On the Physics of Arctic Ice. *Quart. Jour. Geol. Soc*, xxvi, 1870, pp. 671-701.

RHYSSA PERSUASORIA IN THE COUNTIES OF DOWN AND FERMANAGH.

BY REV. W. F. JOHNSON, M.A., F.E.S., M.R.I.A.

IN June last I had a letter from Mr. C. M. Davies of Lenaderg, enclosing a large ichneumon fly which he had captured flying about a rustic rose-arch. The insect was so much crushed in the post that I could not satisfactorily determine it, so I wrote to Mr. Davies asking him to send me, if possible, further specimens. This he most kindly did, sending me two more. On examination these proved to be *Rhyssa persuasoria*, Linn., a species for which I know of but two records from Ireland, viz., Stradbally, Co. Waterford, by Morley[1] and Co. Louth by Pentland.[2]

I was in Donegal when Mr. Davies wrote to me and on my return I went to Lenaderg, where he and his brothers most kindly showed me the rose-arch, and pointed out a place which they had marked where Rhyssa had inserted its terebra. I examined the place with a low power lens, but as it was more than a month since Rhyssa had operated naturally there was no trace of her boring, but it was plain that it had been made into the solid wood. Mr. Davies and his brothers watched Rhyssa at work and have communicated their observations to me. Rhyssa was observed to run about on the wood trying one place after another with its antennae as if prospecting for a suitable place to make its attack. There were holes in the wood made some by *Sirex gigas* and others, which were smaller, by a Crabro of which Mr. Davies sent me specimens. Rhyssa was seen to insert its ovipositor into these holes, having first found them with its antennae ; but it was also seen to bore into the solid wood at a place selected after careful investigation with its antennae. In the ovipositor of Rhyssa is comprised the terebra or borer and the valvulae or sheaths, two in number, which enclose the terebra when not being used for boring. Having selected a spot with its antennae, the sheath being directed backwards, the terebra is brought forward between the legs, and, guided

[1] "British Ichneumons," iii., 28. [2] *Irish Naturalist*, xxi., 147-8.

by the antennae, commences to work at the proper place. When its whole length has been thrust into the wood, it is withdrawn and put into the sheath, and the whole apparatus is then inserted into the hole already bored, being guided and directed thereto by the hind pair of legs which press on either side. Mr. Davies saw the fly bore into the solid wood till its terebra was up to the hilt and then withdraw it, place it in the sheath, and insert the whole. The process occupied twenty minutes, a period which agrees with Mr. Pentland's observation.

Sir Charles Langham has also curiously enough come across *Rhyssa persuasoria* at Tempo Manor. His cowman, who seems to be a very observant old man, told him that there were very large flies with long tails flying round a tree (a Silver Fir). Sir Charles went to the tree and a large ichneumon flew off and was duly captured. He kept the tree under constant observation for a week and took ten females but no male Rhyssa. He then had the tree cut down and carried into his workshop, where he obtained a male as well as another female besides many *Sirex gigas* of both sexes.

Sir C. Langham's observations as to the use of terebra and ovipositor agree with those of Mr. Davies, though he had not so good an opportunity of observation as the Rhyssa kept some ten or twelve feet up the tree. He says that it used its antennae like an ant, laying down first one and then the other on the bark of the tree when searching for a place to attack. I quote his description :—" She evidently knew there was a grub near, and wandered about in a small circle with her tail cocked, and then found the place and began to bore."

Another he found with its terebra firmly fixed deep in the wood. Having got it out with a good deal of trouble he proceeded to investigate, and found three galleries of Sirex larvae beneath the place she was working at, showing the sure knowledge obtained by the antennae of the proper place to bore into.

The old cowman told Sir C. Langham that he had been watching Rhyssa at the tree for two years and that in the evenings about six p.m. (by the sun) he saw some go into the large holes, *i.e.*, those of Sirex, head first " to roost,"

and that they had partly their *tails* out. Sir Charles failed to observe this curious habit though he watched frequently, but the old man is quite clear on the point, and moreover declared that he noticed one day a tail sticking out, took hold of it and pulled and was horrified when the fly came out and dropped it hastily fearing it would sting him. This is a most remarkable occurrence. and I do not see how the truth of the old man's observation can be impugned seeing he actually pulled Rhyssa out by the ovipositor.

Another curious thing that Sir C. Langham observed was that when examining the tree after it had been cut down, he noticed what looked like a piece of horse-hair sticking out of two of the large holes; these were with difficulty extracted, one being broken in the process, and on being examined under the microscope were seen to be the terebra of Rhyssa; in each case it was fixed tightly in the wood. This looks as if Rhyssa had been surprised at work and devoured by some insectivorous bird, the terebra being left as unpalatable. Sir C. Langham sent me the unbroken terebra and I find that it is 55 mm. in length, with longitudinal grooves running the whole length, somewhat flat, the surface highly polished; there are three separate points shown in this terebra, the first at the end with nine teeth and running from each an oblique lateral groove, the second at a distance of 5 mm. with three teeth and grooved longitudinally, the teeth smaller than those of first; the third 1.5 mm. from second with four teeth larger than those of second part. The second and third points were blunter than the first; the terebra is hollow.

In two other females which I received from Mr. Davies and Sir C. Langham respectively I find in one all the points at the end of the terebra, in the other the second and third points coalesced, and a short distance from the end. I conclude from what I have seen that these second and third points work up and down from the first point and thus make the boring. Neither Sir C. Langham nor Mr. Davies observed any rotatory motion of the insect; the latter says he only noticed a kind of pulsating of the abdomen but no movement to

right or left. The valvulae or sheaths are two in number and hollowed so as to receive the terebra, they are black and covered with short hairs. From what I have said above it is plain that when the egg is to be deposited the sheath has to be used as well as the terebra, so that it seems most probable that the egg passes down on the surface of the terebra and is kept in place by the sheaths.

Mr. Davies observed Rhyssa on the wing in June, seeing both sexes. Sir C. Langham did not observe it till August 4th, but as there were several about he thinks they may have probably been about before that date. In each case the timber attacked by the Sirex was dead but not rotten.

I desire to thank very heartily Sir Charles Langham and Mr. C. M. Davies for their most valuable help, without which this paper could not have been written.

Poyntzpass.

LEPIDOPTERA FROM EAST TYRONE.

BY THOMAS GREER.

In the April number of the *Irish Naturalist* for the year 1916 I contributed a short account of the Lepidoptera occurring in this district. During the years 1918 and 1919 a number of additional species were met with. I am indebted to Dr. J. W. H. Harrison, of Newcastle-on-Tyne, for the record of the tineid moth, *Lemnatophila salicella*, hitherto unknown in this country.

The following are the more interesting insects observed, those marked thus * are new records for Ulster :—

Euchloe cardaminis L.—A male with all wings of a pale yellow, May, 1918; a female with both upper wings streaked with orange, near Grange, May, 1919.

Lycaena icarus Rott.—A fine male with orange marginal spots on upper side of lower wings; July, 1919.

Ino statices L.—Tamnamore, two specimens at rest on flowers of *Lychnis Flos-cuculi*, May, 1919.

Miana bicoloria Vill.—Several examples at Ragweed bloom in Aug., 1918; very rare in inland localities.

Agrotis tritici L.—Killymoon, not rare, on Ragweed, Aug., 1918-19; no inland records.

Amphipyra pyramidea L.—Killymoon and Loughry, Aug., 1918-19, common at sugar; rare in the North of Ireland

Orthosia suspecta Hüb.—Killymoon, fairly abundant at Ragweed bloom and sugar, July-Aug., 1918-19.

Euclidia mi Clerck.—Common near Tamnamore, May, 1919.

***Hydrelia uncula** Clerck.—Locally abundant near Tamnamore flying in the afternoon sunshine over damp meadows, May, 1919.

Phigalia pedaria Fb.—Fairly abundant in the district, males common at light, one female bred from larva.

***Amphidasys strataria** Hufn.—Loughry Woods, a fine female, at rest on a sallow trunk, April, 1918.

***Bapta temerata** Hb.—Near Stewartstown, locally abundant among Blackthorn scrub; one example near Tamnamore, also at Emyvale, Co. Monaghan.

Oporabia autumnaria Gn.—Killymoon Woods, a number captured; identified by Dr. J. W. H. Harrison, October, 1918.

Emmelesia unifasciata Haw.—Larvae abundant in seed pods of *Bartsia Odontites*, Oct., 1919.

Eupithecia succentaureata L.—Several bred, July, and a few at dusk, Aug., 1919, near Grange.

***Eupithecia subfulvata** Haw.—Killymoon; several examples at Ragweed bloom, Aug. 1918. Larvae on Mugwort (*Artemisia vulgaris*), near Grange, Oct., 1919. Only recorded from the east coast of Ireland.

Eupithecia pygmeata Hb.—Found abundantly in May, 1919, near Grange, flying in a damp spot, and at rest on the flowers of Cerastium. Rare and very local in Ireland.

***Leptogramma literana** L.—Loughry Woods, a single specimen, Feb., 1918; only recorded from Killarney.

***Masonia crassiorella** Brd.—A number of cases found on Scots Fir trunks near Tamnamore, May, 1919, and forwarded to Rev. C. R. N. Burrows, who bred two males and one female, which he provisionally identified as this species. An addition to the Irish list.

Nemophora swammerdammella L.—Killymoon, flying in the sun among birch trees, May, 1918.

***Lemnatophila salicella** Hüb.—Bred from larvae by Dr. J. W. H. Harrison, who found them on the roadside near Lissan, feeding upon bramble: not previously recorded from Ireland.

Adela degeerella L.—Near Tamnamore, flying over birch bushes, May, 1919.

Stewartstown, Co. Tyrone.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a Fox from Mrs. Pender, Rabbits from Mr. H. Glass, Mr. H. L. Wrigley, Miss Bradshaw, and Miss Saunders, a Harnessed Antelope from Mr. C. Lokko, a Sparrowhawk from Mr. Byrne, a Cereopsis Goose from Mrs. Power, two Barn Owls from Mrs. Carney, three Linnets from Mr. C. J. McCarthy, eight Chocolate Mannikins, four Spice Birds and three Terrapins from Mr. Rogers. A female Chimpanzee, three Green Monkeys, Mona and Patas Monkeys, a Hamadryas and a Guinea Baboon, a Bonnet Monkey and a Brown Lemur, a Coati-mundi, two African Genets, an Ichneumon, Leadbeter and Roseate Cockatoos, and three Cormorants have been purchased. An Otter, a pair of Sulphur-crested Cockatoos and a pair of Blue-fronted Amazon Parrots have been deposited in the Gardens. Two Lion cubs have been born in the Roberts House, the parents being "Oseni" and "Sheila."

The new Chimpanzee ("Fanny") is a great acquisition, as she is exceedingly active and vivacious, and able to perform a number of clever tricks.

DUBLIN MICROSCOPICAL CLUB.

October 8.—The Club met at Leinster House, the President in the Chair. D. McArdle showed portion of a stem and leaf of *Encalypta streptocarpa* with paraphylla, curious brown-coloured rhizoids with jointed filaments which retain and convey moisture to the moss plant, which grows in dry places. When exposed to light and moisture they soon develop chlorophyll, and grow into normal protonema filaments, which may develop resting buds that may under favourable conditions produce leafy plants. The plant is rarely found in fruit, and may reproduce in this way.

NOTES.

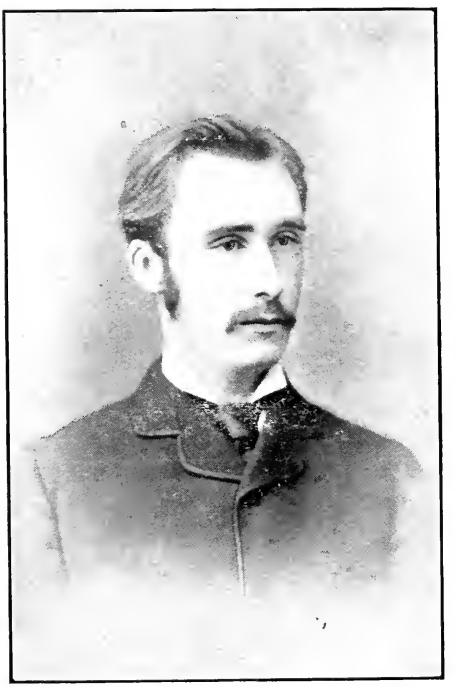
ZOOLOGY.

Colias edusa in Co. Cork.

The Clouded Yellow Butterfly was fairly plentiful about Cork Harbour during the end of August and the first half of September of this year. The specimens were mostly in very good condition, and among them was one female of the rare variety *helice*.

W. S. D. Westropp.

National Museum, Dublin.



NATHANIEL COLGAN
(about 1883).

To face page 121.

NATHANIEL COLGAN.

IRISH science is poorer for the death of Nathaniel Colgan, who passed away on October 2 at the age of 68. Developing an interest in natural history comparatively late in life, unequipped with a scientific training, and diffident, moreover, about seeking information from fellow-workers, Colgan nevertheless found himself—almost against his will, as one might say—drawn into the scientific life of Dublin. Courteous, humorous, and a real lover of nature, he earned the friendship and respect of a large body of Irish naturalists, and his death will be deplored widely.

If he acquired knowledge of many places and things outside of the daily round, this was due to his enquiring spirit and restless initiative, for fate had decreed for him an uneventful life. Born in Dublin, 28th May, 1851, he was educated at the Incorporated School, Aungier Street, and at the age of 20 obtained by examination a clerkship in the Dublin Metropolitan Police Court. In that service he spent his life, retiring under the age limit in 1916. It was characteristic of him that though offered several posts in London, he selected the only Irish post which was vacant. Throughout his life "his first, best country ever was at home," and the continental excursions which he undertook in later years had for their object not only the seeing of foreign lands, but the elucidating of problems of Irish interest by study of cognate questions in adjoining regions.

Long before science claimed him, he displayed an active interest in local literary matters. In 1873 he joined a little band who produced and circulated a manuscript magazine called "Varieties," his first contribution being a paper on Sir Thomas Browne and the "Religio Medici," which was followed a year later by one on Francois Rabelais. Later he saved the paper from extinction by assuming the editorship, in which he continued for several years. He had a facile pen, and succeeding years saw many contributions to the "Irish Monthly," "Tinsley's Magazine," and "Hibernia." These were largely sketches of European travel, for in 1875 he had undertaken the first of a series of summer tours which added greatly to the interest of

life, and, when later on he took up systematic and distributional problems in botany and zoology, gave him a wide and intelligent outlook, and helped to avoid that insular standpoint which is often difficult to banish when one's field of vision is restricted by a barrier of sea. On many of these trips he had pleasant and useful companions, whose comradeship ripened into life-long friendships. The names which appear most frequently in his notes of travel of this period and in correspondence of succeeding years are those of his brother William (now rector of Ballinlough, Co. Roscommon), K. D. Doyle (now an engineer in Argentina), and C. F. D'Arcy, the present Archbishop of Dublin.

France, Italy, Switzerland, Spain and Morocco were visited in turn, as well as places nearer home, such as the west of Ireland. As early as 1880 botanical notes begin to creep into his sketches. His first "botanical" paper, "Plant-hunting in the Dublin Mountains," published in the "Irish Monthly," 1880, was a skit, of which the idea was possibly derived from Carlyle's "Sartor Resartus." In the following year "Plant-hunting in the Central Pyrenees," a series of five papers, was published in "Tinsley's Magazine." I have not been able to see this in Dublin, but, in spite of a suspicious similarity of title, I assume it was a serious contribution. His interest in Irish botany had evidently been growing during these years, for it was "in the course of a week's botanizing in the County Wicklow" in July, 1884, in the company of his brother and the future Archbishop, that he came upon *Saussurea alpina* on Tonlagee over Lough Ouler, its first station in eastern Ireland. This find had two important results for him, for through it he made the acquaintance of A. G. More, and, no doubt on the suggestion of the latter, sent a note on the plant to the "Journal of Botany"—his first communication to a scientific journal. The same plant brought about the acquaintance of the present writer with Colgan, occasioned by its discovery on the Mourne Mountains four years later. It was from this time onwards, and due largely to the influence of More—an adept at encouraging a taste for natural science and in directing it into practical channels—that he began to pay attention to local botany

in more than a desultory way. Possibly a trip to Kerry in 1892 with R. W. Scully, who was getting to work at his exploration of that interesting region, was instrumental in deciding him on commencing systematic investigation into the flora of his own county. But it was characteristic of him that he went to work with no flourish of trumpets. Indeed, when in 1893 the Committee of the Dublin Naturalists' Field Club (of which Colgan was an original member) proposed to organize a botanical survey of the Dublin area, it was with some surprise that they learned that he was already at work on the same investigation.

Once taken up, the projected Flora of Dublin was pushed forward with energy. Never was a county more thoroughly examined, and from the floristic point of view his book, published in 1904, was a model in its painstaking accuracy and careful detail. But he was no more than embarked on this work before another larger task devolved upon him. A. G. More died in 1895, and under the terms of his will Colgan and his friend Scully were appointed to complete and see through the press the new edition of "Cybele Hibernica" for which More had been collecting materials for many years. Although More's annotated copy of "Cybele" provided much of the additional matter which had accumulated since 1866 in the way of fresh stations for the rarer plants, much more was required before the work could assume the shape in which in 1898 it was produced. The whole vexed question of nomenclature had to be faced; wide investigations into the correct allocation of old records, the soil relations of the flora, the Irish names of plants, were undertaken; so that the new "Cybele" bore abundantly the impress of both the energy and the care of its foster-parents. The test of time confirms the value of the work of Colgan and Scully, and deepens the debt of gratitude which Irish botanists owe to them. On the publication of "Cybele" Colgan returned with energy to the "Flora of County Dublin," which was duly published six years later.

I am not acquainted with the circumstances which first attracted him to the Mollusca. No doubt so many years of steady work at the Flowering Plants led to a desire

for a change of study; and since 1900 he had been living close to the sea at Sandycove, where marine life offered itself to his attention. But shortly after the publication of the Dublin Flora we find him working hard at the Marine Mollusca, encouraged and aided by the knowledge which A. R. Nichols freely placed at his disposal. A small aquarium was started, and dredging expeditions, especially in Dalkey Sound and the Malahide estuary, were undertaken, mostly in conjunction with the little band of marine zoologists who formed the "Dublin Marine Biological Association." Special attention was paid to the Nudibranchs, and many valuable observations on this fascinating group were made and recorded. When the Clare Island Biological Survey was commenced in 1909, Colgan undertook the Mollusca, and also an enquiry into the local Irish names of animals and plants.

He had joined the Dublin Naturalists' Field Club on its foundation in 1886, and in 1894 had been elected a member of the Royal Irish Academy, but for many years these societies seldom saw him, a certain diffidence restraining him from mingling freely with his fellow-members, or taking an active part in their proceedings. Indeed, so far as I am aware, his first appearance as the reader of a paper at a scientific meeting was when he presented his Clare Island reports to the Academy in 1911. The jolly parties in whose company he carried out shore-collecting and dredging around that western isle melted the slight shyness which was constitutional with him, and his fellow-workers on those occasions will remember him as the best of good company. About the same time he accepted the Vice-Presidency of the Dublin Field Club—which he had previously declined more than once—and two years later he became President. When the Cosmos Club, founded for the discussion of scientific problems, was established in 1917, Colgan at once became one of its most active members, and contributed materially to the lively debates which characterized its meetings.

The list of his writings (other than his many contributions to this Journal) which appears below well expresses the successive phases of his interests. His mind had a strong

leaning to the archaeological and historical side of any subject which caught his attention, and his acquaintance with several European languages enabled him to pursue these studies beyond the limits set for most Irish naturalists. One may instance his papers "The Shamrock in Literature" (*infra*), "An Irish Naturalist in Spain in the Eighteenth Century" (*I. N.*, xx., 1), and "On the Occurrence of Tropical Drift Seeds on the Irish Atlantic Coasts" (*infra*), which was published only four days before his death. In science he called himself a sceptic, by which he meant the adoption of a critical attitude towards many statements which others were willing to accept as proven. "But *is* it?" was his frequent question, and many an entertaining discussion followed. His kindly "scepticism" was one of his most attractive traits, and often led to a critical examination of premisses which shed valuable light on the subjects which he studied.

One who knew him better than any of his friends writes:—"It could be said of him, truly, *humani nil a me alienum puto.* He loved his kind (hence his enjoyment of humour in literature or society); he loved his country and helped to know it and make it known in his own quiet way; he loved true knowledge, and followed its beck along many paths. His contribution therefore to humanity, knowledge and culture is a real one, and worthy of imitation."

R. Lloyd Praeger.

LIST OF THE PRINCIPAL PAPERS PUBLISHED BY N. COLGAN, OTHER THAN THOSE IN THE *IRISH NATURALIST*.

In preparing the following rough list, as also the foregoing memoir, I have received much assistance from Mr. C. B. Moffat, which I would like to acknowledge. A tolerably complete bibliography of Colgan's writings can be obtained by adding to this list the entries under his name in the Author Index to the *Irish Naturalist*, vols. i.-xxv., published in that Journal in December, 1916, and in the subsequent annual indexes.

1877. A day at the Odilienkloster in Alsace. *Irish Monthly.*

1878. Notes on North Italy (six papers). *Ibid.*

1879. Netherland genre pictures. *Ibid.*
A translation from Richter. *Ibid.*

1880. Up and round Mont Blanc (four papers). *Ibid.*
Dexterity, a colloquy. *Ibid.*

1881. A Bull-fight at Granada in 1880. *Ibid.*
Translation in sonnet form of Petrarch's sonnet cxxix. *Ibid.*
A peep at the Moghrebins (three parts). *Temple Bar.*
From Liverpool to Gibraltar. *Tinsley's Magazine.*

1882. A day on Mount Vesuvius. *Ibid.*
From the North Wall to Naples (four parts). *Hibernia.*
A peep at eastern Sicily (three parts). *Ibid.*
A tramp at home (two parts). *Ibid.*
Half-hours in the National Gallery (two parts). *Ibid.*
Fernan Caballero (two parts). *Ibid.*

1883. Plant-hunting in the Dublin Mountains. *Irish Monthly.*

1884. Plant-hunting in the Central Pyrenees (five parts). *Tinsley's Magazine.*

1885. *Saussurea alpina* in County Wicklow. *Journal of Botany.*

1886. Scrambles in the Kerry Highlands (four parts). *Dublin University Review.*

1888. A day on the Rympfischhorn. *Irish Monthly.*

1892. *Ajuga pyramidalis* in the Aran Islands. *Journal of Botany.*

1894. *Artemisia Stelleriana* in Ireland. *Ibid.*

1897. The Shamrock in literature—a critical chronology. *Journ. Roy. Soc. Antiquaries Ireland.*

1898. Cybele Hibernica, 2nd edition (with R. W. Scully).

1904. Flora of the County Dublin.

1908. Articles "Phanerogams and Vascular Cryptogams" and "Marine Mollusca" in British Association Handbook to the Dublin District.

Contributions towards a revision of the genus Lomanotus. *Ann. Mag. Nat. Hist.*

1909. Notes on locomotion and the use of slime-threads in the Marine Mollusca. *Ibid.*

1911. "Gaelic plant and animal names" and "Marine Mollusca" of Clare Island Survey. *Proc. R. I. Academy.*

1912. Self-evisceration in the Asteroidea. *Ann. Mag. Nat. Hist.*

1919. On the occurrence of tropical drift seeds on the Irish Atlantic coasts. *Proc. R. I. Academy.*

The portrait accompanying this notice has been placed at our disposal by the kindness of Miss Colgan, our friend's sister. It was taken about the year 1883, and represents his aspect when he first turned to the study of Natural Science.

ENTOMOLOGICAL NOTES FOR 1919.

BY REV. W. F. JOHNSON, M.A.

THE summer of 1919 has been remarkable for great heat and a prolonged drought, but also for sudden changes of temperature. The end of May was very warm, but June, in the west at any rate, was at times very cold and was a wet month; July and August were very hot and dry, but at the end of the latter month the nights became very cold and the temperature dropped on several nights to within 10 degrees of freezing point. Thus on the night of the 30th it was 38° F. in my garden, and as the garden is very sheltered and faces south, this would probably indicate two or three degrees lower in more exposed situations. Owing to illness I was unable to take full advantage of the fine weather, and June, which I spent at Portnoo was anything but a good month for insects, hence my captures are few and not particularly interesting.

LEPIDOPTERA.

I was quite disappointed by the lack of butterflies, except the very common species. I saw during the year just one *Pyrameis atalanta* in my garden on September 14th and again on 21st. Not one Peacock or Painted Lady did I see, though my two young friends, Phyllis and Doris Nelson, showed with pride specimens of both, which they had captured near Drogheda.

At Portnoo I got some nice specimens of the Little Blue (*Cupido minima*) but the Marsh Fritillary (*Melitaea aurinia*) which last year was abundant, was this year hardly to be seen. I don't think I saw a dozen the whole time. The Green Hairstreak (*Thecla rubi*) was plentiful as usual among the heather. I saw a Speckled Wood Butterfly and a Small Copper on the wing on October 20th, a testimony to the mildness of the weather.

Of moths I got but few at Portnoo, as might be expected from the weather conditions. At the end of the month I took *Zygaena loniceræ* on the wing in a hay field.

Besides this I met with *Lasiocampa quercus* var *callunae,* a very dark *Cidaria immanata,* and the var. *gallica* of *Hepialus velleda.* This last was very plentiful at dusk with the type form.

Coleoptera.

Early in May I was invited to examine a bee-hive, the occupants of which had succumbed during the winter. I found the bar frames occupied by beetles, far the greatest number were *Cononimus nodifer,* Westw., which was very numerous; with them were a good many *Cryptophagus scanicus* L. var. *patruelis,* Sturm. and three *Homalota intermedia* Thoms. The remains of honey and wax had evidently attracted these intruders.

At Portnoo I picked up a few beetles, but *Carabus clathratus* did not turn up. *Dascillus cervinus, Corymbites cupreus* and *Phyllopertha horticola* were very plentiful. *Corymbites tessellatus* and *Athous hirtus* occurred among herbage near the sea shore, and *Donacia thalassina* with *Cassida viridis* on the roadside. I met with the large white form of *Philopedon geminatus* on the sandhills.

Diptera.

I think the two-winged flies mind the weather less than other insects, for no matter how unseasonable it may be, if there is the least glint of sunshine out they come.

On April 30th while strolling along the road near here I noticed a pair of what I thought were Empids alight on a leaf of the Lesser Celandine. I caught them and found that the female had a little fly in her clutches. I sent the lot to Mr. J. E. Collin, F.E.S., and he very kindly examined them, and tells me that I was right in supposing the larger flies to be Empids and that they are male and female of *Rhamphomyia cinerascens,* and that the prey is a female Chironomid of the genus Metriocnemus. The Empidae are predaceous flies and attack other insects, but a very curious point in their economy has been brought out by Mr. A. H. Hamm of the University Museum, Oxford, in a series of articles on these flies which appeared in the

Entomologists' Monthly Magazine vols. xliii., xliv., and xlv. In these he shows that the male catches a fly but does not devour it himself, instead he brings it as an offering to the female with which he desires to pair, and while she is devouring the prey, pairing takes place. This was what was taking place with the pair I caught.

The most of the flies named below belong to the Syrphidae, this is owing to the fact that I have very little acquaintance with the other families of Diptera. I have worked these out with Mr. Verrall's volume on this section

LEPTIDAE.

Leptis scolopacea L.—Portnoo, June, very common. This fly is not at all shy; it has the habit of flying a few feet and then alighting on almost anything.

SYRPHIDAE.

Pipizella flavitarsis Meigen.—Poyntzpass hill, May, a female.
Chilosia pulchripes Loew.—Poyntzpass, in field about gorse bushes, in May.
C. illustrata Harris.—Poyntzpass, in my garden, July and August.
Platychirus albimanus Fab.—Poyntzpass, garden, May.
P. scutatus Meigen.—Poyntzpass, roadside, April.
Pyrophaena granditarsa Forst.—Poyntzpass, field, August.
Melanostoma ambiguum Fallen.—Poyntzpass, field at gorse, May.
M. mellinum L.—Poyntzpass, field and garden, May. Portnoo, cliff, June.
M. scalare Fab.—Poyntzpass, hill, May.
Leucozona lucorum L.—Poyntzpass, hill, May.
Sphaerophoria campestris Meigen.—Portnoo, June.
Syrphus bifasciatus Fab.—Poyntzpass, hill, May.
Ascia podagrica Fab.—Poyntzpass, hill, May; field, September.
Rhingia campestris Meigen.—Poyntzpass, May; Portnoo, June. This fly is remarkable for the extraordinary snout caused by the elongation of the upper edge of its mouth.
Volucella bombylans L.—Portnoo, June.
Eristalis pertinax Scopoli.—Poyntzpass, May and October. I took specimens of the fly in my garden on October 25th.
E. nemorum L.—Poyntzpass, field and garden, May.
E. horticola De G.—Portnoo, June.
Sericomyia borealis Fallen.—Portnoo, June.

A NEW IRISH WHALE.

BY R. F. SCHARFF, B.SC., M.R.I.A.

A REPORT has recently been issued by Dr. S. F. Harmer on the whales and dolphins stranded on the British coasts during the year 1918.[1] In the *Irish Naturalist* of October-November, 1918, p. 164, reference was made to a previous report on the same subject. We are thus slowly acquiring a knowledge of the species of whales frequenting our shores, and Dr. Harmer is to be congratulated on the success of his efforts to enlist the services of the receivers of wrecks and coastguard officials in elucidating this important natural history problem.

The present report mentions the following species as having been obtained from Irish localities :—

DOLPHIN (*Delphinus delphis*) Barley Cove, Co. Cork, February 5th, 7 ft. 6 in. ; Bunowen, Co. Galway, August 13th, 6 ft. 11 in. ; Cloghmore Point, Co. Galway, September 22nd, 7 ft. ; Schull, Co. Cork, October 30th, 7 ft.

KILLER or GRAMPUS (*Orcinus orca*), Castlewray, Co. Donegal, March 3rd, 11 ft.

BOTTLE-NOSED DOLPHIN (*Tursiops truncatus*), Ballyheigue, Co. Kerry, August 7th, 10 ft. 4 in.

BOTTLE-NOSED WHALE (*Hyperoodon rostratus*), Ballyvaughan, Co. Clare, September 4th, 18 ft. 4 in.

RORQUAL (*Balaenoptera physalus*), Culdaff, Co. Donegal, October 19th, 49 ft.

The most interesting item in the report is the description of TRUE'S BEAKED WHALE (*Mesoplodon mirus*) a species not hitherto known to occur in Irish waters. The readers of this journal may remember that the late Prof. Anderson of Galway announced in 1901 that there was in University College Museum, Galway, a skeleton of a whale, presumably Irish, which he identified with a New Zealand species

[1] S. F. HARMER, "Report on the Cetacea stranded on the British Coasts during 1918," London, 1919, British Museum.

known as *Mesoplodon Hectori*. A few years later a whale of the same species was cast ashore on one of the Aran Islands ; and its skull was procured for the Galway Museum. Prof. Anderson subsequently sent another note[2] to this Journal in which the teeth of this toothed whale were described.

Meanwhile, as already alluded to in the *Irish Naturalist*, 1918, p. 164, a Ziphioid whale which had been stranded at Liscannor, County Clare, in 1917, was secured for the British Museum. It was referred by Dr. Harmer to Cuvier's Whale (*Ziphius cavirostris*). With the assistance of Prof. Mangan who succeeded Prof. Anderson, Dr. Harmer has now carefully re-examined the identification of these three specimens.

After due consideration he came to the conclusion that both he and Prof. Anderson were wrong in their identification. The bones in the neighbourhood of the anterior nares differ widely in Ziphius and Mesoplodon and all the three skulls referred to had the characters of the latter genus. The question thus remained to be decided whether these whales belonged to *Mesoplodon Hectori* or to *Mesoplodon mirus*, the species recently discovered by Prof. True on the coast of Carolina. The two species seem to be very closely allied, but Dr. Harmer now believes all the three Irish specimens to be identical with what he calls True's Beaked Whale (*Mesoplodon mirus*). He promises to give us a more detailed account of them later on.

National Museum, Dublin.

[1] R. F. ANDERSON, "A Note on a Beaked Whale" (*Mesoplodon Hectori* Gray), *Irish Naturalist*, 1901, p. 117.

[2] "The Teeth in *Mesoplodon Hectori*," Gray. *Irish Naturalist*, 1904, p. 126.

IRISH HYMENOPTERA ACULEATA IN 1919.

BY REV. W. F. JOHNSON, M.A., F.E.S.

I DID not capture very many Aculeata this year partly owing to illness and partly owing to the bad weather in June.

I took six species of Nomada at Poyntzpass in May, some in my flower garden and others on the road between my house and Poyntzpass, which I denote by the term "hill." I did not observe any Andrenae in my garden, but *A. albicans* and *A. trimmerana* were nesting in the bank on the roadside but not as far as I could see (for the bank is overgrown with herbage of various kinds) in any great numbers, so I must assume that it was these two species that Nomada was parasitizing.

June I spent in Donegal with very poor results owing to the cold and wet weather.

Wasps were not much in evidence till the latter part of August, when they became numerous, and have continued on the wing till November. I went to look at a wasps' nest in one of my fields on November 4, and they were as active as in July, and that in spite of quite a sharp frost on the night of November 1.

I met with one species I had not noticed here before, viz., *Vespa germanica* F. There must have been a strong nest of them somewhere near for the workers came into the house very freely in September and it was thus my attention was drawn to them; subsequently I captured females and males. This species is very like *V. vulgaris* in appearance and habits, so it is quite easy to confuse the two species, which I suspect I have done in the past. I have now taken all our native wasps here except *V. austriaca* Panz.

All the Portnoo specimens were taken in June and the Poyntzpass Nomada in May. The term "shore" at Portnoo refers to the path leading from the harbour towards Dunmore Head.

Pompilus bicolor Lep. } Portnoo { sandhills.
P. plumbeus F. } Portnoo { shore.
P. niger F. } Portnoo { shore and Dowros-road.

Salius fuscus L.—Newry. Mrs. Johnson took this in a friend's garden on April 24th.

Crabro leucostomus L.—Lenaderg, Co. Down, taken by Mr. C. M. Davies emerging from its burrow in June.

C. capitosus Shuck.—A female, Poyntzpass in July.

C. palmipes L.—Portnoo, on the sandhills and Dowros-road.

Vespa germanica F.—Poyntzpass, September and October.

Odynerus pictus Curt. } Portnoo { bog road and Dowros road.
O. trimarginatus Zett. } Portnoo { shore.

Sphecodes affinis v. Hag.—Poyntzpass hill, May, Portnoo, Dowros-road.

Halictus malachurus Kirby } Portnoo, Dowros-road.
H. subfasciatus Nyl. } Portnoo, Dowros-road.

Andrena cineraria L.—Portnoo sandhills, a battered male.

Nomada goodeniana Kirby (*succincta* Panz.) } Poyntzpass garden.
N. alternata Kirby } Poyntzpass garden.

N. ruficornis L.—Poyntzpass hill, Portnoo shore.

N. bifida Thoms.—Poyntzpass garden, Portnoo shore.

N. hillana Kirby } Poyntzpass hill.
N. flavoguttata Kirby } Poyntzpass hill.

Megachile ligniseca Kirby.—Poyntzpass canal bank, August.

Poyntzpass.

IRISH SOCIETIES.

DUBLIN MICROSCOPICAL CLUB.

H. A. LAFFERTY exhibited microsopic preparations of Dodder (*Cuscuta epilinum*) a member of the Convolvulaceae or Bindweed family parasitic on flax. The preparations showed the method of penetration of the host by the parasite. An appressorium or sucker is at first firmly attached to the cortex of the flax plant, the latter is then penetrated by a cellular outgrowth of absorbing elements from the centre of the appressorium, and by means of these the host is robbed of a certain amount of its nutrient materials. The seeds of the parasite are sown with the flax seed and on account of their small size proper attention to screening would completely eliminate them.

Sir F. W. MOORE exhibited *Rhizoctonia violacea*, parsitic on roots of Mangel. A considerable extent of the surface was covered by this fungus, and much injury was caused to the interior tissues, which were broken down and decaying.

J. N. HALBERT showed specimens of *Planorbis corneus* from the Royal Canal, near Dublin, an account of which is given on pp. 135–6.

REVIEWS.

A NEW BOOK ON BIRDS.

A Practical Handbook of British Birds. Edited by H. F. Witherby, F.Z.S., M.B.O.U., Editor of *British Birds*. Authors of Various Sections: Ernst Hartert, Ph.D., M.B.O.U.; Annie C. Jackson, H.M.B.O.U.; Rev. F. C. R. Jourdain, M.A., M.B.O.U.; C. Oldham, F.Z.S., M.B.O.U.; Norman Ticehurst, M.A., F.R.C.S., M.B.O.U.; and the Editor. Illustrated with Coloured Plates and Numerous Text Figures. In Eighteen Parts. London: Witherby & Co. Price 4s. net per Part.

Mr. Witherby's Handbook, of which four parts have now appeared, is no uncalled for addition to the considerable number of manuals bearing similar titles that recent years have produced. Its appearance was, in fact, rendered necessary by the publication seven years ago of the "Hand-List of British Birds," in which Mr. Hartert, with the aid of most of the collaborators in the book now before us, endeavoured to bring into general use the system of trinomial nomenclature, so applied as to give subspecific recognition to a large number of local races not hitherto looked on as distinct. Ornithologists still differ as to the admissibility of several of these "splits"; but there can be no doubt as to the importance of proper attention to the variations, great or small, on which they are based. The essential feature in Mr. Witherby's book is the minuteness with which it describes every form that the authors of the "Hand-List" of 1912 (which gave no descriptions) pronounced deserving of subspecific rank. From the parts already published, which treat of the Corvidae, Sturnidae, Oriolidae, Fringillidae, Alaudidae, Motacillidae, Certhiidae, Sittidae, Paridae, and Laniidae, it can plainly be seen that no pains have been spared towards the adequate discharge of this necessary work. It will not be possible until the whole book is before us to judge whether the nomenclature advocated by the authors can ever come into real use among field-ornithologists, or whether it will remain a language limited in use to discussions on museum specimens.

At the present stage of our information, it is not use, but abuse of the trinomial nomenclature to apply its terms in records of field observations, when the observer can only guess on geographical grounds that the bird which forms the subject of his note was probably of the race known to frequent the locality where the observation was made. It is clear that without fuller descriptions than have yet been available no observer could identify more than a very small number of these subspecific forms, unless in the shape of dead specimens. Whether things will be much mended in this direction by the publication of all that Mr. Witherby and his colleagues have to tell us is far from evident; but his book is much needed to settle the matter.

The descriptions are aided by illustrations, of which we are told that they are "intended solely as aids to identification." Many of them will be of much use for this purpose; but the one that Irish readers will first turn to is one on which the publishers cannot be congratulated. The

coloured picture of the Irish Coal Titmouse (pl. 9) would, we think, convince any unprejudiced Irishman who accepted its accuracy that the form of *Parus ater* frequenting his neighbourhood must be either the British or the Continental variety; for we never see in this country a bird approaching the high coloration bestowed in the plate on the figure of *P. a. hibernicus*. The reproduction of shades of colour is, however, such a difficult matter that we must not dwell too much on a solitary blemish that happens rather to hit the Irishman in the eye. Another coloured plate (pl. 4) is unfortunate in representing a Crossbill in the unwonted act of feeding on the seeds of a Scots Fir cone that is still growing on the tree. It may be from a museum specimen, but if so the setting was undoubtedly fanciful. The Hand-Book, however, devotes little of its space to the subject of habits, and there is scarcely an attempt made to indicate differences in this respect between the various geographical races. Mr. Oldham's notes on the "field-characters" distinguishing the various species are, as might be expected, excellent so far as they go; but only a few lines are allotted them under each head, and in the case of a Continental form this feature is generally lacking. Of the descriptions, giving the sequences of plumage and moults from the nestling stage to maturity, Mr. Witherby fairly claims in his preface that they are "more complete than any hitherto published in a book on British birds." If for this reason alone the new Hand-book will be indispensable to working ornithologists, and it cannot fail of a very general welcome.

C. B. M.

NOTES.

ZOOLOGY.

Planorbis corneus in Co. Dublin.

In the early part of August last I noticed a number of dark-coloured objects among weeds at the entrance to the Broadstone branch of the Royal Canal quite close to Dublin. On fishing out a few of these I was pleased to recognize *Planorbis corneus*, one of the largest and rarest of the Irish water snails. They seemed quite at home in this locality and both young and fully-grown specimens were to be seen gliding about on the masses of green alga which almost filled that part of the canal in the late summer and autumn. On other occasions they were noticed in smaller numbers until the end of October or a little later. None were seen far from the main colony but a detailed search was not made.

Has so conspicuous a species escaped notice for years or has it been established there quite recently? The Royal Canal has been searched by me from time to time until about six or seven years ago and no specimens of this Planorbis were found, though I should state that collecting was usually begun further out from the city than where the present colony lives.

It seems likely that the snail has been carried down, probably attached to floating weeds, from a more inland place. The reason for this surmise is that the species has been recorded from Maynooth in County Kildare, but I have been unable to find out if it occurred actually in the canal or in neighbouring ponds. The rare water beetle *Harmonia appendiculata* is a case in point, the first Irish specimens having been discovered many years ago in the canal at the Hill of Down, County Meath, and it is now known to occur in another part of the canal close to Dublin. This is, however, a very difficult insect to detect on account of the wonderfully protective colouring and a habit of clinging tightly to the stems of the water plants amongst which it lives.

A glance at the distributional maps in Mr. Stelfox's list of Irish land and freshwater mollusca shows clearly the very local range of *Planorbis corneus* in Ireland. In fact it has been recorded only from a few places in Queen's County and Kildare inhabiting drains and shallow pools. There is also a western locality, a small artificial pond in County Sligo, but it was doubtless introduced there amongst water plants.

J. N. Halbert.

National Museum, Dublin.

Recent Records of Irish Birds.

The following should have been included in the notes under the above head published on p. 94, *supra* :—Mr. C. J. Carroll publishes an interesting article on "Newly Discovered Irish Colonies of Roseate and Sandwich Terns" (*British Birds*, Nov., 1917); J. Cunningham records a flock of Crossbills at Fernhill, Belfast (*ibid.*, Oct., 1917); and in the same journal for January, 1918, are records of Hoopoe in Donegal and Snowy Owl in Antrim (W. H. Workman), and Green Sandpiper in King's Co.—(Helen M. Rait-Kerr)

Vol. XXVIII. No. 1.
JANUARY, 1919.

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Keeper, National History Department, Royal Scottish Museum, Edinburgh.

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Vol. XXVIII. No. 2.
FEBRUARY, 1919.

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Vol. XXVIII. No. 4.
APRIL, 1919.

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MAY, 1919.

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ALEX. THOM AND CO., LIMITED, DUBLIN

Vol. XXVIII. Nos. 7-8.
JULY-AUG., 1919.

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A Monthly Journal
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GENERAL IRISH NATURAL HISTORY.

ORGAN OF THE
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NOV.–DEC., 1919.

The Irish Naturalist

A Monthly Journal
ON
GENERAL IRISH NATURAL HISTORY.

ORGAN OF THE
ROYAL ZOOLOGICAL SOCIETY OF IRELAND
DUBLIN MICROSCOPICAL CLUB,
BELFAST NATURAL HISTORY & PHILOSOPHICAL SOCIETY,
BELFAST NATURALISTS' FIELD CLUB,
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PRICE 1s.

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EDITED BY
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